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IMMEDIATE WATER POLLUTION CONTROL NEEDS FOR THE INTERSTATE AND INTRA-STATE WATERS OF THE HUDSON-MOHAWK REGION

Federal Water Pollution Control Administration
Metuchen, New Jersey

June 1967

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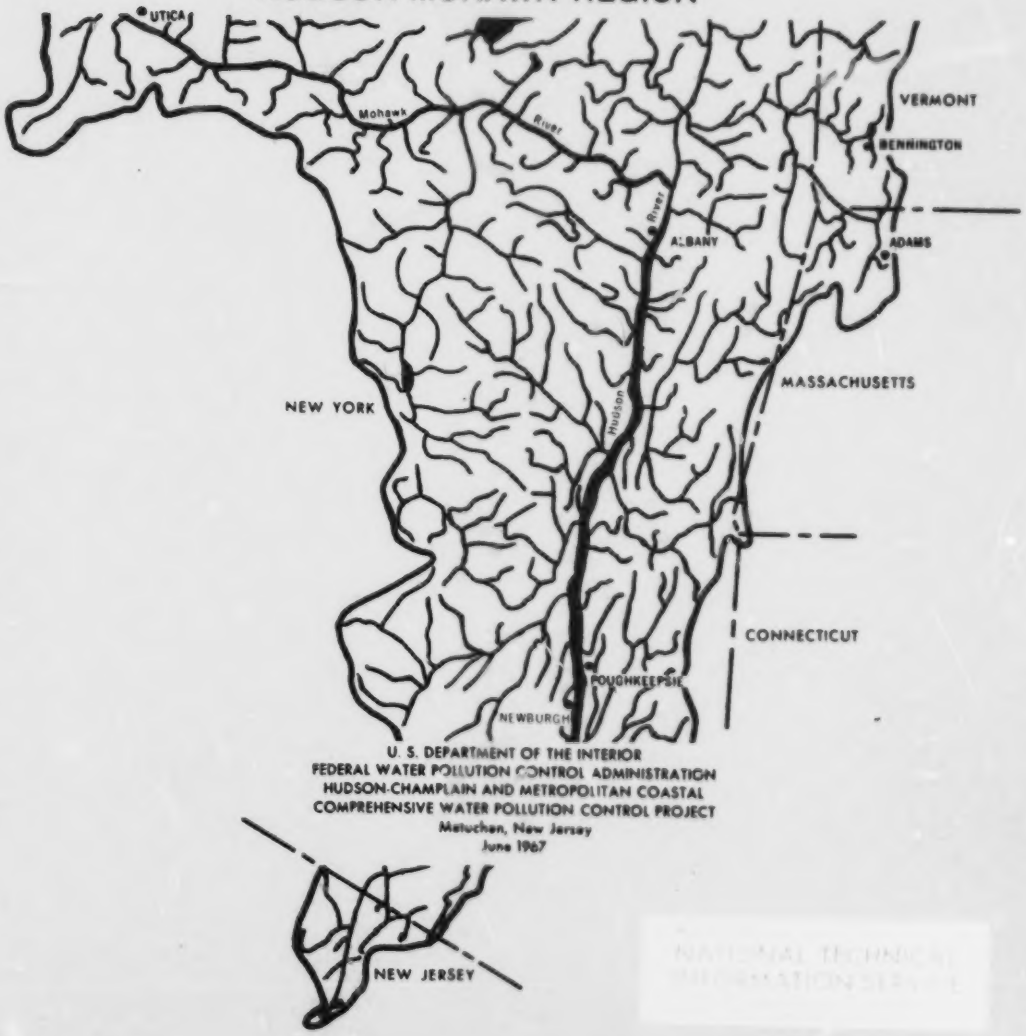

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
HUDSON-CHAMPLAIN AND METROPOLITAN COASTAL
COMPREHENSIVE WATER POLLUTION CONTROL PROJECT
Metuchen, New Jersey
June 1967

NATIONAL TECHNICAL
INFORMATION SERVICE

REPORT ON THE

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A D D E N D A

for

Report on Immediate Water Pollution Control Needs

Interstate and Intrastate Waters

Hudson - Mohawk Region, June, 1967

More recent information derived from state water pollution control agencies and recent FWPCA field visits have resulted in a number of modifications to the interstate industrial construction needs by priority and construction activity. These changes, listed on pages 2 and 3 of this addenda, generally indicate an upward adjustment in the industrial organic load (expressed as population equivalents) and would accordingly increase the construction cost estimates for the industrial waste source category.

At the second Hudson River Conference, held on September 20, 1967, the conferees agreed that considerable progress has been made toward abating pollution of the interstate waters of the Hudson River and its tributaries. The conferees concluded that prior to discharge to the waters of the conference area, all wastes shall (a) be treated to provide a minimum of 80 percent reduction of Biochemical Oxygen Demand (BOD) at all times, recognizing that to achieve this will require a design of 90 percent average removal of BOD, or (b) shall be treated, as approved by the State Water Pollution Control Agency, to a degree necessary to meet the water quality standards approved by the Secretary of the Interior. Effective disinfection of all treated waste effluents is required to protect water uses. The conferees also accepted the schedule requiring that all remedial facilities be operational by 1972. In addition, the State and Interstate conferees expressed concern over the failure of Congress to appropriate the total funds previously authorized for the Federal construction grants program. The conferees finally agreed that periodic progress meetings shall be called by the chairman after consultation with all conferees.

Modifications to the Interstate

Industrial Construction Needs

Waste Source	Modification
Frost White Paper Mills, Inc.	Delete from listing; out of business.
Wood Flong Corp.	Existing treatment adequate.
Ford Motor Co.	Should be included in Priority III and requires Construction Activity C.
Finch Pruyn & Co.	Increase population equivalent to 480,000.
Manning, John A. Paper Co.	Increase population equivalent to 110,000.
West Virginia Pulp & Paper Co.	Increase population equivalent to 460,000.
Allegheny Ludlum Steel Corp.	Delete population equivalent and change Construction Activity Code to C.
Pownal Tanning Co.	Reduce population equivalent to 23,000.
IBM	Delete from listing; discharges into city sewer system.
Behr Manning & Co.	Increase population equivalent to 13,000 and include in Priority I category.
Mohawk Paper Mills, Waterford, N. Y.	Reduce population equivalent to 2,200.
Bendix Corp.	Delete population equivalent.
Callanan Road Improvement	Delete from listing; no discharge.
General Electric Co.	Reduce population equivalent to 8,300.
Dairymen's Leage Co-op.	Delete from listing; discharges into city sewer system.
General Aniline & Film Corp.	Increase population equivalent to 132,000 and transfer to Priority I category.
Knauss Bros. Inc.	Delete from listing; discharges into city sewer system.
Bearse Mfg. Co.	Delete from listing; discharges into city sewer system.
Ramapo Piece Dye Works	Delete from listing; out of business.
Rubberoid Co.	Delete from listing; no significant discharge.
Sterling Winthrop Research	Transfer to Priority II and decrease population equivalent to 15,000. Change Construction Activity Code to D.

Modifications to the Interstate

Industrial Construction Needs (Cont'd)

Waste Source	Modifications
Sterling Drug Inc.	Change name to Winthrop Labs. Transfer to Priority I and increase population equivalent to 75,000. Change Construction Activity Code to D.
Star Expansion Ind. Corp.	Delete from listing; no discharge.
Smith Bros. Inc.	Delete from listing; discharges into city sewer system.
Brunette Cheese Mfg.	Delete from listing; discharges into city sewer system.
International Paper Co. (Corinth)	Increase population equivalent to 84,000.
Hedrick Brewing Co.	Delete from listing; out of business.

The above changes in industrial waste sources and construction needs have not been incorporated in the text or tables of this report. Although, as a result of these modifications, the number of industrial sources would be reduced from 102 to 90, the net waste loading, expressed in terms of population equivalents would be increased from 1,650,000 to 1,960,000 PE. Because the cost estimates for industrial construction needs in this report are based upon waste loadings expressed as population equivalents, the effect of the above modifications would be to increase the total estimated cost for construction of needed industrial waste treatment facilities.

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I - INTRODUCTION

This report reviews the water pollution problem in the Hudson-Mohawk Region, which is defined to include the waters in the Mohawk River Basin east of, and including Rome, New York and the Hudson River Basin north of the Bear Mountain Bridge at the Orange and Putnam Counties' southern boundaries. The discharge of wastes from municipalities, industries and other sources degrades water quality, preventing full utilization of these waters.

The purpose of this report is to delineate those actions which should be undertaken immediately to prevent further degradation and to provide enhancement of these waters. These actions include not only the construction of new or improved municipal and industrial waste treatment facilities, but also studies, surveys and research which are needed to develop sound water quality management programs for the future.

The recommendations included in this report are based upon preliminary analysis of the data obtained from published reports, from state agency files, and from the files of the Federal Water Pollution Control Administration. The recognition of the inadequacy of these data indicates the need for additional studies and for field surveys to augment available information and to further verify the contents of this report. In preparing these recommendations the needed construction activities were determined in order of priority of urgency, using the available data and a scoring procedure described in the Appendix.

The report has been prepared under the authority of the provisions of the Federal Water Pollution Control Act, as amended, and in accordance with Presidential Executive Order 11288, "Prevention, Control and Abatement of Water Pollution by Federal Activities."

II - SUMMARY AND CONCLUSIONS

1. The Hudson-Mohawk Region is composed of two major drainage basins located in the Northern and Middle sections of the Hudson River Valley. These basins are the upper and middle Hudson River (from the headwaters to the Orange and Putnam counties' southern boundaries) and the Mohawk River. These inter- and intrastate waters receive the discharges of wastes from municipal collection and waste treatment systems, factories, individual sewerage systems, boating and land drainage. As a result, these waters are polluted with bacteria, organic wastes, suspended solids, toxic chemicals and nutrients.

2. The governmental agencies within the Region which have direct responsibility for water pollution control are the New York State Department of Health; the Vermont Department of Water Resources; the Massachusetts Department of Natural Resources, Water Resources Commission; and the New Jersey State Department of Health. Assistance and/or coordination is provided by the Federal Water Pollution Control Administration.

3. Pollution of these waters not only presents a hazard to the health of persons using them for water supply and water contact recreation, but also restricts full utilization for fish and wildlife, industrial and agricultural needs, and presents an unsightly and objectionable appearance. Such degradation can result in deterioration of much of the regional economy, which is based in large part on recreation and similar water based activities.

4. The major sources of pollution of these waters are raw and inadequately treated municipal and industrial wastes. There are 395 known municipal, Federal and industrial sources of waste which affect interstate or intrastate waters and which require pollution abatement action. On the basis of BOD, the industrial waste loadings are approximately twice as great as that from municipalities. Major industrial sources include the pulp and paper industry, which accounts for almost half of the total industrial waste load, tanning operations, textile products, food processing, heavy and light manufacturing operations, and wire and cable products.

5. The interstate waters of the Region are affected by the discharge of inadequately treated wastes from 108 municipal and Federal facilities and 102 industries. Of the municipal sources, 47 provide no treatment, and an additional nine have primary plants which are obsolete. Seventy-two municipalities do not disinfect waste prior to discharge. Of the 102 industries, 57 account for 92 percent of the total industrial BOD loading. Included in this group are all of the paper and pulp industries in the Region.

6. There are a total of 108 municipal and 77 industrial sources which affect only intrastate waters within the Region. Of the municipal sources, 53 discharge with no treatment and an additional four have primary treatment plants which are obsolete.

7. To achieve satisfactory water quality, all municipal and industrial sources should receive a minimum of secondary treatment which is defined as 90 percent BOD removal and 95 percent removal of suspended solids. In addition, all municipal and most industrial wastes should receive effective disinfection. In certain cases, removal of nutrients and toxic materials are required in addition. These criteria served as guidelines to determine immediate construction needs and to calculate cost estimates for this report.

8. A summary of immediate needs costs to correct municipal and industrial sources of pollution on inter- and intrastate waters by subbasin (Upper Hudson, Middle Hudson, Mohawk) is presented in Table II-1.

9. The estimated cost to abate the pollution of the interstate waters is presented in Table II-2 and totals $169,000,000, with more than $100,000,000 required for industrial abatement.

10. The estimated cost to abate the pollution of the intrastate waters is presented in Table II-3, and totals $117,600,000, of which $55,900,000 is needed for construction of municipal waste treatment facilities and a slightly larger portion needed to correct industrial waste sources.

11. In addition to the waste discharges from municipalities and industries, water quality within the Region is degraded to an unknown degree by wastes from such sources as individual septic tanks and cesspools, combined sewers and urban runoff, recreational and commercial boating, agricultural runoff, camping sites, by heat from power plants and industries, and by natural aging and enrichment of the lakes.

12. To make possible the control of pollution from these sources, and to ensure the funds expended for immediate construction activity result in improvement of water quality, additional legislation, studies and planning will be required.

13. The States of Massachusetts and Vermont should adopt and implement laws that will:

a. Prohibit dumping of litter and disposal of untreated waste from watercraft;

b. Establish a state-wide sampling and monitoring program;

c. Provide for adequate operation and maintenance of waste treatment plants, including licensing of operators.

14. The States of New York and New Jersey should expand their manual and automated surveillance network. New Jersey should require more effective operation and maintenance of waste treatment plants.

15. All four states should adopt and implement additional laws which recognize the need for regional planning in water resource development and require local governments to consider regional plans in terms of water supply and waste treatment.

16. The Federal Water Pollution Control Administration should assist current state programs by undertaking cooperative studies, surveys and research in the following areas:

a. Location of areas with high densities of individual septic tanks and cesspools, and the effects of such systems on surface and ground water quality;

b. Effects of stormwater overflow and urban runoff on water quality, and methods to control such sources;

c. Field sampling and laboratory analyses to determine present water quality in those areas where existing data are inadequate;

d. Types and amounts of agricultural chemicals used in the Region, with a determination of the effects of runoff of such pollutants on the receiving waters;

e. Location of areas with obnoxious growths of aquatic weeds and algae, with control measures to reduce nutrient inflow to such waters as well as to eliminate present problems by physical removal or chemical control;

f. Location and extent of thermal pollution problems;

g. Accurate and current inventories of all sources of municipal and industrial waste, to include waste volumes and characteristics;

h. Feasibility of joint municipal-industrial treatment facilities, to include any needed pre-treatment of industrial waste;

i. Comprehensive basin planning to coordinate releases from power generation installations and other water resources development structures to enhance water quality during periods of critical low stream flow;

j. Magnitude of the problem of pollution by recreational and commercial boats, to include oil pollution, and needed control procedures to abate this source of pollution;

k. Training programs for waste treatment plant operators and state surveillance personnel to assure maximum treatment plant efficiencies;

l. Extent of water quality degradation due to dredging and associated activities to include coordination of Federal, state, local and private interests in dredging operations; and

m. Effect of flow regulation, navigation and hydroelectric dams, and develop comprehensive plans to coordinate releases.

17. Each state should undertake additional studies, surveys and programs to cover the following:

a. Projects designed to replace ineffective individual waste disposal systems by municipal collection and treatment facilities;

b. Inventory of boat marinas to determine the adequacy of on-board and on-shore treatment devices, and the need for such devices to handle waste from recreational boating, and;

c. Determination of the magnitude of pollution from camping facilities, and means to control such sources.

18. An investigation must be undertaken of the existing legal and institutional arrangements which deal with water quality problems on a local, regional or statewide basis to determine their adequacy in effecting and implementing water pollution control programs.

19. Investigations must be carried out to determine the fiscal contribution of each basin entity (government and private) to meet expenditures required for immediate and long range pollution control and resource management programs. The role of Federal, State, local and private bodies must be evaluated in terms of costs and benefits. An indication of the economic impact water pollution abatement may have on the Region as a whole should be determined if programs aimed at achieving better water quality are to receive an appropriate share of public and private expenditures.

20. A need for close coordination of water quality problems indicates that a regional approach is best suited to promote inter-

local cooperation between municipalities, to coordinate planning among townships and counties, and to administer State and Federal programs. Regional water management authorities must ensure that the needs of the minor or tributary river basins are reveiwed, weighed and/or integrated into the major river drainage basin programs.

TABLE II-1

SUMMARY OF COST DATA FOR WASTE SOURCE ABATEMENT
THROUGH 1990 FOR INTER- AND INTRASTATE WATERS AND SUB-BASINS,
HUDSON-MOHAWK REGION

Item	Municipal		Industrial		
	Number Plants	Cost ($000)	Number Plants	Cost ($000)	Total ($000) [a]
Interstate Waters	108	68,700	102	100,700	169,400
Intrastate Waters	108	55,900	77	61,700	117,600
	216	124,600	179	162,400	287,000
Sub-Basin [b]					
#1	48	20,100	33	67,900	88,000
#2	57	37,100	57	48,300	85,400
#3	111	67,400	89	46,200	113,600
	216	124,600	179	162,400	287,000

[a] See Appendix C for municipal and industrial cost estimating procedures.

[b] Sub-Basin #1 (Upper Hudson from headwaters to Waterford)
Sub-Basin #2 (Mohawk River drainage basin)
Sub-Basin #3 (Middle Hudson from Waterford to Orange and Putnam Counties southern lines near Peekskill).
See Figures (Maps) for delineation of subbasins.

TABLE II-2

SUMMARY OF COST DATA FOR WASTE SOURCE ABATEMENT
THROUGH 1990 FOR INTERSTATE WATERS,
HUDSON-MOHAWK REGION

Priority [a]	Municipal No. Plants	Municipal Cost ($000)	Industrial No. Plants	Industrial Cost ($000)	Total [c] ($000)
I	12	24,500	10	38,500	63,000
II	54	30,000	26	20,400	50,400
III	33	12,800	35	31,900	44,700
IV	9	1,400	31	9,900	11,300
	108	68,700	102	100,700	169,400
Construction Activity Code (Municipal) [b]					
01	47	41,100			
02	9	5,300			
04	50	21,900			
05	1	200			
06	1	200			
	108	68,700			
Construction Activity Code (Industrial) [b]					
A			16	7,800	
B			8	4,500	
C			21	1,500	
D			57	86,900	
			102	100,700	

a/ See Appendix A for priority criteria.

b/ See Appendix B for construction activity coding.

c/ See Appendix C for municipal and industrial cost estimating procedures.

TABLE II-3

SUMMARY OF COST DATA FOR WASTE SOURCE ABATEMENT
THROUGH 1990 FOR INTRASTATE WATERS,
HUDSON-MOHAWK REGION

Priority [a]	Municipal No. Plants	Municipal Cost ($000)	Industrial No. Plants	Industrial Cost ($000)	Total [c] ($000)
I	6	17,600	18	20,200	37,800
II	46	16,500	36	29,700	46,200
III	56	21,800	23	11,800	33,600
IV	-	-	-	-	-
	108	55,900	77	61,700	117,600
Construction Activity Code (Municipal) [b]					
01	53	30,800			
02	4	1,800			
04	47	19,900			
05	1	500			
06	3	2,900			
	108	55,900			
Construction Activity Code (Industrial) [b]					
A			21	12,000	
B			2	2,700	
C			14	1,800	
D			40	45,200	
			77	61,700	

a/ See Appendix A for priority criteria.

b/ See Appendix B for construction activity coding.

c/ See Appendix C for municipal and industrial cost estimating procedures.

III - IMMEDIATE CONTROL NEEDS

To determine the immediate corrective actions necessary to ensure the preservation, development and enhancement of natural waters within the Region, an evaluation was made of immediate construction needs for each known municipal and industrial waste source. Nonconstruction needs, including research and field studies, are discussed in Section IV of this Report. In developing the needed construction activity, it was recognized that secondary treatment was the minimum permissible to provide that the need for such water use as water supply, recreation and sport-fishing could be met. Using this criteria, as well as such additional factors as dilution water available, strength and volume of waste discharge, existing treatment, and use of the receiving water, a system of priorities was formulated to identify the most significant problem areas.

All waste sources requiring corrective action were classified into one of four priority groupings ranked in descending order of urgency. Further details on the criteria used to develop these priorities are provided in the Appendix, but in general, those sources with relatively high population equivalents in terms of BOD loading, those with little or no treatment and those which discharge into streams which have only small amounts of dilution water were assigned the highest priorities.

The following sections present these immediate construction needs, together with estimated costs and priority, for both the interstate and intrastate waters of the Hudson-Mohawk Region.

INTERSTATE CONSTRUCTION NEEDS

The interstate waters of the Hudson-Mohawk Region are affected by 108 known municipal, institutional and federal waste discharges and 102 known industrial waste sources which require some form of immediate construction to bring under control. These municipal waste sources serve an estimated 621,000 persons. Seventy-two of these sources provide no disinfection of the waste. On a BOD basis, the industrial waste loadings have been estimated to be equivalent to that from 1,650,000 persons, approximately two and one-half times the municipal loading needing abatement.

Needs by Priority

Table III-1 summarizes the needed construction activity by priority of urgency. Table III-2 identifies the specific sources in each priority by State. Priority I, those waste sources demanding the most urgent attention includes 12 municipal and ten industrial waste sources.

The 12 municipal sources are discharges of raw or inadequately treated wastes from approximately 178,000 persons. Nine of these facilities do not chlorinate their waste discharges. The Troy plant, serving 66,000 persons, is the largest municipal polluter in this priority.

The industrial sources in Priority I include seven paper and pulp operations which represent an estimated waste load equivalent to 980,000 persons. These plants are characterized by large waste volumes, color and high concentrations of BOD and solids. The Finch Pruyn & Co. plant at Glens Falls and the West Virginia Pulp and Paper Co. at Waterford are the largest paper plants. Other moderately large pollutors included in this priority are: in Vermont, the Pownal Tannery, which discharges a waste equivalent to 32,800; in New York two manufacturing plants (Ford Motor Co. and Allegheny Ludlum Steel) representing a load equivalent to 8,100 persons. The Pownal Tanning Co. and the Ford Motor Co. are suspected of discharging toxic materials with their respective wastewaters.

Priority II includes 54 municipal systems serving 199,000 persons and 26 industries discharging an estimated waste equivalent to 215,000 persons. Twenty-seven municipal systems discharge the raw wastes of 83,000 persons. Two of the largest waste sources in this priority (Hudson and Newburgh), are included among these raw discharges. Six obsolescent primary facilities inadequately treating the wastes of 11,000 persons are also included in this priority. The industries included in Priority II are mainly textile producers, paper and pulping plants and machinery operations. Of the 26 industrial sources, the 22 located in New York account for an estimated population equivalent of 141,000 persons. The largest industrial waste source in Priority II is the U. S. F. Arnold Finishing Co., Adams, Massachusetts which discharges an estimated BOD load equivalent to 61,000 persons into the Hoosic River. Another large pollutor is the H. F. Binch Co., Glens Falls, New York which discharges a waste estimated equivalent to 50,000 persons into the Hudson River. Selected reference data indicate that four manufacturing operations expel waste oils and toxic metals in varying degrees throughout the Region. Watervliet Arsenal, a Federal installation, is included among these suspected sources of toxic materials.

Included in Priority III are 33 municipal waste systems which serve 236,000 persons. Of these sources, the obsolescent primary plant at Albany is the largest, and accounts for about 50 percent of the total population served by systems in this priority. In addition, Priority III includes 35 industrial sources, 32 of which are in New York, two in Massachusetts and one in Vermont. These sources represent an estimated aggregate population equivalent of 334,000 persons.

The nine municipal systems in the least urgent Priority IV category handle the wastes of 8,000 persons. All of these systems which provide primary treatment are in New York. There are 31 industries included in this least urgent category which account for an estimated

waste equivalent to 76,000 persons. The majority of these plants are machinery operations. Three plants are also suspected sources of waste oils and toxic chemicals.

Needs by Type of Construction

Table III-3 summarizes immediate construction needs in the interstate waters by type of construction required. Table III-4 presents detailed needs by source for municipal systems and Table III-5 for industrial sources. Approximately 268,000 persons are served by 47 municipal collection systems that presently provide no treatment, and which will require construction of complete secondary treatment facilities. The majority of these systems (43) serving 254,000 persons are located in New York.

There are nine plants, all in New York, which were built to provide primary treatment but are now obsolete and should be replaced by new secondary treatment facilities. These plants serve an estimated 142,000 persons.

There are 50 primary plants and one intermediate plant serving 209,000 persons which must be upgraded to provide secondary treatment. Forty-five of these 51 plants serving 160,000 persons are located in New York. There is one substantially overloaded secondary plant in Wallkill, New York which requires upgrading and expansion.

Of the industrial sources which require construction of some type, there are 57 facilities, including all pulp and paper mills (22), accounting for 92 percent of the 1,650,000 total estimated population equivalent that require appropriate segregation of wastes, biological treatment and disinfection. Twenty-one other industrial firms with relatively low PE discharges need segregation of waste and non-biological treatment. The remaining 24 industrial plants require only construction of appropriate secondary treatment facilities.

Immediate Construction Costs, Interstate Waters

The estimated costs of the construction needs for interstate waters are summarized in Tables III-6 (Municipal Costs) and III-7 (Industrial Costs). To finance this program of immediate pollution abatement of the interstate waters in the Hudson-Mohawk Region will require an estimated total expenditure of at least $169,000,000. Of this total, 41 percent is needed to provide secondary treatment plus chlorination to all municipal waste sources; the balance is to provide treatment to industrial discharges. The costs include plant capacity sufficient to serve the anticipated population projected to 1990. Details on the procedure used for cost estimation are in the Appendix.

INTRASTATE CONSTRUCTION NEEDS

There are 108 municipal and 77 industrial waste sources, all in New York, which discharge raw or inadequately treated waste to the intrastate waters of the Hudson-Mohawk Region. The municipal sources represent a sewered population of 521,000 persons, while the industrial sources account for an estimated BOD loading equivalent to 573,000 persons. Of the 108 municipal sources, 62 do not disinfect their waste discharges.

Needs by Priority

Table III-8 summarizes the immediate construction needs for intrastate waters by priority of urgency. Table III-9 presents the priorities by individual source. Priority I includes six municipal and 18 industrial sources. All but one of the municipal sources discharge raw and unchlorinated wastes. Three of these raw systems, Utica, Amsterdam and Cairo account for a third of the total intrastate sewered population. Ten tannery operations are the major industrial wastes sources listed in Priority I. Their wastes contain highly organic matter, as well as unknown quantities of toxic chemicals and may in some cases carry disease bacteria. Forty-four municipal and two federal sources are in Priority II and 56 municipal facilities are in Priority III. The majority of those municipal sources in Priority II are relatively small collection systems which discharge raw and unchlorinated wastes from about 50,000 persons. Forty-one of the 56 systems in Priority III accounting for 153,000 persons provide primary treatment. The Schenectady plant serving 81,000 persons is the largest of these facilities. Three other municipal systems built to provide secondary treatment (the Gloverville Plant is the largest) are presently overloaded and need to be expanded.

The 59 industrial sources in Priority II and III represent 65 percent of the total industrial load. The largest contributors to this waste load are the textile establishments classified in these two priorities.

Needs by Type of Construction

Construction needs by type of facility are summarized in Table III-10, while Tables III-11 and III-12 present detailed needed construction for municipal and industrial sources respectively. Fifty-three municipal sources discharge untreated waste and require construction of complete secondary treatment and chlorination facilities. Four existing primary plants are obsolete and must be abandoned and replaced by new secondary treatment works, while 47 primary plants and one intermediate facility are suitable for expansion and upgrading to secondary treatment. In addition, there are three secondary plants presently overloaded and in need of upgrading and expan-

sion. Of the industrial sources, 40 accounting for nearly all of the estimated BOD loading, require segregation of wastes, biological treatment and disinfection. Fourteen other firms need segregation of waste and non-biological treatment. The remaining 23 sources require only construction of appropriate secondary treatment facilities.

Immediate Construction Costs, Intrastate Waters

The estimated costs to construct the needed treatment facilities to abate wastes discharged to intrastate waters are presented in Tables III-13 (municipal) and III-14 (industrial). The total cost for both municipal and industrial pollution control needs on intrastate waters is estimated to be $118 million, of which municipal construction activity will require $55.9 million or 48 percent of the total.

More than half of the municipal costs must be expended to either replace obsolete primary facilities with plants providing secondary treatment, or to construct entirely new secondary treatment facilities for those sources which discharge raw wastes.

Nearly 75 percent of the industrial costs will be required to provide facilities for the segregation of wastes, biological treatment and disinfection.

TABLE III-1

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION
SUMMARY [a]

Priority [b]	New York No.	New York Pop. [c]	Other No.	Other Pop. [c]	Total No.	Total Pop. [c]
Municipal, Institutional and Federal						
I	11	165,500	1	12,000	12	177,500
II	45	147,300	9	51,900	54	199,200
III	33	235,900	-	-	33	235,900
IV	9	7,900	-	-	9	7,900
	98	556,600	10	63,900	108	620,500
Industrial						
I	9	988,000	1	32,800	10	1,020,800
II	22	141,000	4	74,300	26	215,300
III	32	330,800	3	3,000	35	333,800
IV	31	75,600	-	-	31	75,600
	94	1,535,400	8	110,100	102	1,645,500
Totals						
I	20	1,153,500	2	44,800	22	1,198,300
II	67	288,300	13	126,200	80	414,500
III	65	566,700	3	3,000	68	569,700
IV	40	83,500	-	-	40	83,500
	192	2,092,000	18	174,000	210	2,266,000 [d]

[a] See Table III-2 for listing of individual sources.

[b] See Appendix A for priority criteria.

[c] Population served for municipal sources; Population for industrial sources based upon population equivalents determined on a BOD basis using an estimated daily per capita loading of 0.167 pounds of BOD per day.

[d] Total of known population served and calculated population equivalents.

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority I [c]		
A. Municipal and Institutional		
New York		
Troy	01	66.0
Beacon	01	17.5
Waterford	01	2.9
Green Isle	01	4.0
Menands	01	2.5
Kingston	01	20.0
Valley Falls	01	.6
Albany (part)	01	13.0
Hoosic Falls	01	4.0
Cohoes	01	23.0
Rensselear	01	12.0
		165.5
Massachusetts		
Adams	01	12.0
		12.0
B. Industrial		
New York		
Finch, Pruyn & Co.	D	350.0
Mohawk Paper Mills Inc., Cohoes, N. Y.	D	8.8
Manning, John A. Paper Co.	D	44.0
W. Virginia Pulp & Paper Co.	D	420.0
Frost White Paper Mills, Inc.	D	22.1
Wood Flong Corp.	D	60.0
Ford Motor Co.	D	1.1
Allegheny Ludlam Steel Corp.	D	7.0
International Paper Co.	D	75.0
		988.0
Vermont		
Pownal Tanning Co.	D	32.8
		32.8
		1198.3

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority II [c]		
A. Municipal and Institutional		
New York		
Troy (part)	01	.3
Coeymans	01	.8
Kingston	01	9.3
Rhinebeck	01	2.1
Catskill	01	5.8
McKnownville	01	2.0
Rhinecliff	01	.6
Camp Chi-Wan-Da, Esopus	01	.3
Watervliet	02	15.2
Valley Falls	01	.3
Troy (part)	01	.3
Slate Hill	01	.1
Saugerties - V. DUP	02	1.6
Walden	04	4.9
Saugerties - V. EBP	02	.8
Fort Edward (U)	01	3.7
Greenwich	01	2.3
Coxsackie	01	2.7
Ravina	04	2.4
Beacon-Mattawan	04	1.8
Colonie	01	1.6
Wappinger Falls	04	3.5
Berlin	02	1.4
Saugerties	02	1.5
Hemstreet Park	04	.8
Maplewood S. D.	04	2.5
North Creek	01	.7
Stillwater	01	.4
Pleasantdale	01	.8
Mt. St. Alphonsus, Esopus	04	.2
Marist Prep School for Boys, Esopus	04	.3
Coxsackie	01	.5

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority II [c] (Cont'd)		
A. Municipal and Institutional (Cont'd)		
New York (Cont'd)		
Wiltwyck School for Boys, Esopus	04	.1
Bethlehem	04	12.0
Goshen	04	4.0
Wallkill	06	1.2
New Paltz	04	3.0
Tivoli	02	.8
Hudson Falls	04	7.7
Lake Luzerne	01	.8
Tahawus (Newcomb)	04	.9
Hudson (part)	01	12.0
Newburgh	01	32.0
Hemstreet Park	01	.5
Pleasantdale	01	.8
		147.3
Massachusetts		
Clarksburg	01	.2
North Adams	04	19.5
Williamstown	04	5.2
		24.9
New Jersey		
Sussex	01	1.7
Sparta	01	.5
Hamburg	04	9.2
Franklin	04	3.6
		15.0
Vermont		
Bennington	04	10.0
Manchester	04	2.0
		12.0

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority II [c] (Cont'd)		
B. Industrial		
New York		
Republic Steel Corp.	C	-
Watervliet Arsenal (Fed. Facility)	D	.1
IBM	C	-
Imperial Color & Chemical Co.	D	10.0
A & A Metal Products Co.	C	-
H & F Binch Co.	D	50.0
Behr Manning & Co.	D	1.2
Thermo Products Inc.	B	1.1
United Board & Carton Corp.	D	23.0
Cohoes Fabric Printers Co.	D	2.8
Mohawk Paper Mills, Waterford, N. Y.	D	8.9
Bendix Corp.	D	1.0
Scott Paper Co.	D	17.7
Kemp & Beatley	D	5.5
James Thompson & Co.	D	2.2
Callanan Road Improvement Co.	C	-
Hudson Cement Co.	C	-
General Electric Co.	D	12.0
F & J Sand & Gravel	C	-
F. Tetz & Sons	C	-
Snow White Laundry	D	2.2
John L. Thompson & Sons	B	3.3
		141.0
Massachusetts		
Budd Paper Products	D	5.3
U. S. F. Arnold Finishing	D	61.0
		66.3
Vermont		
Warren Wire Co.	C	-
Vermont Tissue & Paper Co.	D	8.0
		8.0
		414.5

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority III [c]		
A. Municipal and Institutional		
New York		
Warwick - New Hampton	04	.3
Warwick	04	1.5
Tahawus (Newcomb)	04	.5
Goshen - Boys Trg. School	04	.1
Hadley	04	.4
Newcomb Central High School	05	.7
Newcomb	04	.3
S. Glens Falls	04	4.1
Athens	01	1.5
Marlboro	01	1.8
Cold Springs	01	1.8
Corinth Power Plant	04	1.9
Mechanicville	04	6.8
Stillwater	04	1.4
Manchester (V)	02	2.0
Corinth	04	1.3
Germantown	01	.4
Catskill (Clementon)	01	.7
St. Joseph's Juniorate, Esopus	01	.1
St. Gabriel Scholast., Esopus	01	.1
E. Greenbush, E. Greenbush S. D.	04	5.2
Albany (part)	02	117.0
Highland	04	3.0
Highland Falls	04	.5
Poughkeepsie - Dept. of Mental Health	04	7.1
Poughkeepsie	04	41.0
Poughkeepsie - Arlington S. D.	04	6.2
Cornwall	02	2.0
Germantown C. School	04	.3
Newburgh - Wintergren S. D.	04	.2
Castleton	01	1.0
Glens Falls	04	20.1
		231.3

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority III [c] (Cont'd)		
B. Industrial		
New York		
Hood, H. P. & Sons	A	.4
Thomas A. Galante & Sons	D	7.0
Huyck Felt Co.	D	26.0
Fort Orange Paper Co.	D	21.2
Lasaponara Cheese Co.	A	.5
Watervliet Iron & Brass Foundry Inc.	C	-
Minisink Rubber Co.	B	1.0
Dairymen's League Co-Op	A	.2
Warrensburg Board & Paper	D	30.0
Hollingsworth & Vose	D	18.0
Cornwall Paper Mills Co.	D	47.0
Gen. Aniline & Film Corp.	D	7.0
N. American Cement Corp.	C	-
Jova Mfg. Corp.	C	-
Terry Brick Corp.	C	-
Patrician Paper Co.	D	6.0
Standard Packaging Corp.	D	8.0
Stevens & Thompson Paper Co.	D	7.6
Tobin Packaging Co.	A	32.8
N. Y. Trap Rock Corp.	C	-
Hollingsworth & Vose Blandy Division	D	1.8
Arrow Co., Bleachery Div.	D	9.8
Carr Packing Co.	A	2.8
Hedrick Brewing Co.	A	6.6
St. National Kosher Prov. Corp.	A	2.6
Schaefer, F & M Brewing Co.	A	29.5
Knauss Bros. Inc.	A	2.6
American Felt Co.	D	19.0
Majestic Weaving Co.	D	2.8
Braendly Dye Works Inc.	D	16.0
Steinfield Fabrics Co.	D	22.7
Fran Mushrooms Co.	A	1.9
		330.8

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority III [c] (Cont'd)		
B. Industrial (Cont'd)		
Massachusetts		
L. L. Brown Paper Co.	D	2.2
Dewey & Almy Chemical Div. - W. R. Grave & Co.	D	0.5
		2.7
Vermont		
Fairdale Farms Inc.	A	.3
		.3
C. Federal		
New York		
West Point - U. S. M. A.	04	4.6
		4.6
		569.7
Priority IV [c]		
A. Municipal and Institutional		
New York		
Holy Cross Monastery, Esopus	04	.1
Santa Maria Noviate, Esopus	04	.1
Mother Cabrini Sch., Esopus	04	.2
N. Y. Tr. Sch - Girls, Hudson	04	.4
Castle-V. A. Hosp., Fishkill	04	1.2
Newburgh-Colden Park	04	.6
New Windsor	04	.8
Highland Falls	04	4.0
N. Y. Tr. Sch.-Claverack	04	.5
		7.9

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTERSTATE WATERS, HUDSON-MOHAWK REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority IV [c] (Cont'd)		
B. Industrial		
New York		
Grumman Allied Ind. Inc.	D	-
Beacon Piece Dyeing	D	12.1
Bearse Mfg. Co.	D	3.0
National Gypsum Co.	D	6.0
Newburgh Printing & Finishing	D	2.8
Ramapo Piece Dye Works	D	2.8
Rubberoid Co.	D	.7
Cantine, Martin Co.	D	3.5
Texaco Inc.	D	2.4
Eastern Casting Corp.	C	-
Babbitt, B. T. Inc.	B	6.0
Nytralite Aggregate	C	-
Champlain Brick Co.	C	-
Oscar Fisher Inc.	D	-
Sterling Winthrop Research	B	20.0
Sterling Drug Inc.	B	6.8
Associated Coca Cola	A	1.0
Pepsi Cola (Albany)	A	.5
Starr Expansion Ind. Corp.	D	.2
Agway Inc.	B	2.0
Smith Bros. Inc.	B	1.0
Brunette Cheese Mfg.	A	.2
Bethlehem Steel Corp.	D	.5
Borden Co.	A	.2
Walter Motor Truck Co.	D	.1
Powell & Minnock Brick Works Inc.	C	-
N. Y. Trap Rock Corp.	C	-
Jova Brick Works	C	-
Ferroxcube Corp of America	C	-
Star Brick Co.	C	-
K. B. Products	A	3.8
		75.6
		83.5
	TOTAL	2,266.0 [d]

a/ See Tables III-4 and III-5 for definitions of construction activity codes.

b/ Population served for industrial sources is the population equivalent on a BOD basis.

c/ See Appendix A for priority criteria.

d/ Total of known population served and calculated population equivalents.

TABLE III-3

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION,
SUMMARY [a]

Construction Activity Code [b]	New York No.	New York Pop. [c]	Other No.	Other Pop. [c]	Total No.	Total Pop. [c]
Municipal, Institutional and Federal						
01	43	253,600	4	14,400	47	268,000
02	9	142,300	-	-	9	142,300
04	44	158,800	6	49,500	50	208,300
05	1	700	-	-	1	700
06	1	1,200	-	-	1	1,200
	98	556,600	10	63,900	108	620,500
Industrial						
A	15	85,600	1	300	16	85,900
B	8	41,200	-	-	8	41,200
C	20	-	1	-	21	-
D	51	1,408,600	6	109,800	57	1,518,400
	94	1,535,400	8	110,100	102	1,645,500
TOTALS		2,092,000		174,000		2,266,000 [d]

[a] See Tables III-4 and III-5 for listing of individual sources.

[b] See Tables III-4 and III-5 for identification of construction activity code.

[c] Population served for municipal sources; population equivalent for industrial sources determined on a BOD basis using an estimated daily per capita loading of 0.167 pounds of BOD per day.

[d] Total of known population served and calculated population equivalents.

TABLE III-4

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION
MUNICIPAL NEEDS

Code 01: Discharging raw sewage - build secondary plant.

Waste Source	Population Served (000)
New York	
Troy	66.0
Beacon	17.5
Waterford	2.9
Green Isle	4.0
Menands	2.5
Kingston	20.0
Valley Falls	.6
Albany (Part)	13.0
Hoosic Falls	4.0
Troy (Part)	.3
Coeymans	.8
Kingston	9.3
Rhinbeck	2.1
Catskill	5.8
McKnownville	2.0
Cohoes	23.0
Rhinecliff	.6
Camp Chi-Wan Da	.3
Valley Falls	.3
Troy (Part)	.3
Slate Hill	.1
Fort Edwards	3.7
Greenwich	2.3
Coxsackie	2.7
Colonie	1.6
North Creek	.7
Rensselaer	12.0
Stillwater	.4
Pleasantdale	.8
Coxsackie	.5
Lake Luzerne	.8
Hudson (Part)	12.0
Newburgh	32.0
Hemstreet Park	.5
Pleasantdale	.8
Athens	1.5
Marlboro	1.8
Cold Springs	1.8
Castleton-on-Hudson	1.0
Germantown	.4
Catskill (Clementon)	.7
St. Josephs Juniorate	.1
St. Gabriel	.1
	253.6

TABLE III-4

IMMEDIATE CONSTPUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION
MUNICIPAL NEEDS (Cont'd)

Code 01: Discharging raw sewage - build secondary plant. (Cont'd)

Waste Source	Population Served (000)
Massachusetts	
Adams	12.0
Clarksburg	.2
	12.2
Vermont	
None	
New Jersey	
Sussex	1.7
Sparta	.5
	2.2
	268.0

Code 02: Not suitable for upgrading to secondary. Build new primary and upgrade to secondary.

Waste Source	Population Served (000)
New York	
Watervliet	15.2
Saugerties - V Dup	1.6
Saugerties - V EBP	.8
Berlin	1.4
Saugerties	1.5
Tivoli	.8
Manchester (V)	2.0
Albany (Part)	117.0
Cornwall	2.0
	142.3

Code 04: Primary plant suitable for upgrading. Build new secondary facilities.

Waste Source	Population Served (000)
New York	
Walden	4.9
Ravina	2.4

TABLE III-4

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION
MUNICIPAL NEEDS (Cont'd)

Code 04: Primary plant suitable for upgrading. Build new secondary facilities. (Cont'd)

Waste Source	Population Served (000)
New York (Cont'd)	
Beacon - Mattawan	1.8
Wappinger Falls	3.5
Hemstreet Park	.8
Maplewood SD	2.5
Mt. St. Alphonsus	.2
Marest Prep School	.3
Wiltwyck School	.1
Bethleham	12.0
Goshen	4.0
New Paltz	3.0
Hudson Falls	7.7
Tahawas (Newcomb)	.9
Warwick - New Hampton	.3
Warwick	1.5
Tahawas	.5
Goshen - Boys School	.1
Hadley	.4
Newcomb Central High School	.3
S. Glens Falls	4.1
Corinth Power Plant	1.9
Mechanicville	6.8
Stillwater	1.4
Corinth	1.3
E. Greenbush SD	5.2
Highland	3.0
Highland Falls	.5
Poughkeepsie Department of Health	7.1
Glens Falls	20.1
Poughkeepsie	41.0
Poughkeepsie - Arlington SD	6.2
Germantown Central School	.3
Newburgh - Wintergreen	.2
Holy Cross Monastery	.1
Santa Maria Noviate	.1
Mother Cabrini School	.2
New York Training School for Girls	.4
New York Training School - Claverack	.5
Castle Pt. VA Hospital	1.2
Newburgh - Colden Park	.6
New Windsor	.8
Highland Falls	4.0
West Point U. S. M. A.	4.6
	158.8

TABLE III-4

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION
MUNICIPAL NEEDS (Cont'd)

Code 04: Primary plant suitable for upgrading. Build new secondary facilities. (Cont'd)

Waste Source	Population Served (000)
Massachusetts	
North Adams	19.5
Williamstown	5.2
	24.7
Vermont	
Bennington	10.0
Manchester	2.0
	12.0
New Jersey	
Hamburg	9.2
Franklin	3.6
	12.8
	208.3

Code 05: Intermediate plant suitable for upgrading. Build new secondary facilities.

Waste Source	Population Served (000)
New York	
Newcomb	.7
	.7

Code 06: Secondary plant presently overloaded but in good condition. Build new facilities to handle overload.

Waste Source	Population Served (000)
New York	
Wallkill	1.2
	1.2
TOTAL	620.5 a/

a/ Total of known population served.

TABLE III-5

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION,
INDUSTRIAL NEEDS

Code A: Provide secondary treatment or equivalent plus chlorination.

Waste Source	Population Equivalent (000)
New York	
Fran Mushrooms Co.	1.9
K. B. Products Corp.	3.8
Hood, H. P. & Sons	.4
Lasaponoro Cheese Co.	.5
Dairymen's League Co-op.	.2
Tobin Packing Co.	32.8
Carr Packing Co.	2.8
Hedrick Brewing Co.	6.6
St. National Kosher Prov.	2.6
Schaefer, F & M Brewing Co.	29.5
Knauss Bros., Inc.	2.6
Associated Coca Cola	1.0
Pepsi Cola, Albany	.5
Brunette Cheese Mfg. Co.	.2
Borden Co.	.2
	85.6
Vermont	
Fair Dale Farms, Inc.	.3
	.3
	85.9

Code B: Provide secondary treatment or equivalent.

Waste Source	Population Equivalent (000)
New York	
Thermo Products Inc.	1.1
John L. Thompson & Sons	3.3
Minisink Rubber Co.	1.0
Babbitt, B. T., Inc.	6.0
Sterling Drug, Inc.	6.8
Sterling Winthrop Research	20.0
Agaway Inc.	2.0
Smith Bros.	1.0
	41.2

TABLE III-5

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION,
INDUSTRIAL NEEDS (Cont'd)

Code C: Provide for segregation and separate treatment of one or more types of waste.

Waste Source	Population Equivalent (000)
New York	
Republic Steel Corp.	-
IBM	-
A & A Metal Products Inc.	-
Callanan Road Improvement Co.	-
Hudson Cement Corp.	-
F & J Sand and Gravel	-
F. Tetz and Sons	-
Watervliet Iron & Brass Foundry, Inc.	-
N. American Cement Corp.	-
Java Mfg. Corp.	-
Terry Brick Co.	-
N. Y. Trap Rock Corp.	-
Eastern Casting Corp.	-
Nytralite Aggregate	-
Champlain Brick Co.	-
Powell & Minnock Brick Works Inc.	-
N. Y. Trap Rock Corp.	-
Java Brick Works	-
Ferroxcube Corp. of America	-
Star Brick Co.	-
	-
Vermont	
Warren Wire Co.	-
	-

Code D: Same as C; with biological treatment plus chlorination for all or part of the waste load.

Waste Source	Population Equivalent (000)
New York	
Finch, Pruyn & Co.	350.0
Mohawk Paper Mills Inc., Cohoes, N. Y.	8.8
Manning, John A. Paper Co.	44.0
W. Virginia Pulp and Paper Co.	420.0
Frost White Paper Mills, Inc.	22.1
Wood Flong Corp.	60.0
Ford Motor Co.	1.1
Allegheny Ludlam Steel Corp.	7.0
International Paper Co.	75.0
Watervliet Arsenal (Federal Facility)	.1
H & F Binch Co.	50.0

TABLE III-5

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION,
INDUSTRIAL NEEDS (Cont'd)

Code D: Same as C; with biological treatment plus chlorination for all or part of the waste load. (Cont'd)

Waste Source	Population Equivalent (000)
New York	
Behr Manning and Co.	1.2
United Board & Carton Corp.	23.0
Cohes Fabric Printers Co.	2.8
Mohawk Paper Mills, Waterford, N.Y.	8.9
Bendix Corp.	1.0
Scott Paper Co.	17.7
Kemp & Beatley Inc.	5.5
James Thompson & Co.	2.2
General Electric Co.	12.0
Snow White Laundry	2.2
Tohmas A. Galante & Sons	7.0
Huyck Felt Co.	26.0
Fort Orange Paper Co.	21.2
Hollingsworth and Vose	18.0
Cornwall Paper Mills Co.	47.0
Imperial Color & Chemical	10.0
General Aniline & Film, Corp.	7.0
Patrician Paper Co.	6.0
Standard Packing Corp.	8.0
Stevens & Thompson Paper Co.	7.6
Hollingsworth and Vose Blandy Div.	1.8
Arrow Co., Beachery Div.	9.8
American Felt Co.	19.0
Majestic Weaving Co.	2.8
Braendly Dye Works, Inc.	16.0
Steinfield Fabrics Co.	22.7
Grumman Allied Ind., Inc.	-
Beacon Piece Dyeing	12.1
Bearse Mfg. Co.	3.0
National Gypsum Co.	6.0
Newburgh Printing & Finishing	2.8
Ramapo Piece Dye Works	2.8
Rubberoid Co.	.7
Cantine, Martin Co.	3.5
Texaco Inc.	2.4
Oscar Fisher Inc.	-
Starr Expansion Ind. Corp.	.2
Bethlehem Steel Corp.	.5
Walter Motor Truck Co.	.1
Warrensburg Board & Paper	30.0
	1408.6

TABLE III-5

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, HUDSON-MOHAWK REGION,
INDUSTRIAL NEEDS (Cont'd)

Code D: Same as C; with biological treatment plus chlorination for all or part of the waste load. (Cont'd)

Waste Source	Population Equivalent (000)
Vermont	
Pownal Tanning Co.	32.8
Vermont Tissue and Paper Co.	8.0
	40.8
Massachusetts	
L. L. Brown Paper Co.	2.2
Budd Paper Products	5.3
U. S. F. - Arnold Finishing Co.	61.0
Dewey & Almy Chemical Division W. R. Grace & Co.	0.5
	69.0
	1518.4
TOTAL	1645.5 a/

a/ Total of calculated population equivalents.

TABLE III-6

IMMEDIATE CONSTRUCTION COSTS,
INTERSTATE WATERS, HUDSON-MOHAWK REGION,
MUNICIPAL NEEDS THROUGH 1990

Priority [a]	No. Plants	Est. Plant Cost ($000) [b]	Estimated Cost Ancillary Work ($000) [c]	Total ($000)
I	12	13,400	11,100	24,500
II	54	16,400	13,600	30,000
III	33	7,000	5,800	12,800
IV	9	800	600	1,400
	108	$37,600	31,100	$68,700

Construction Activity Code [a]				
01	47	22,500	18,600	41,100
02	9	2,900	2,400	5,300
04	50	12,000	9,900	21,900
05	1	100	100	200
06	1	100	100	200
	108	$37,600	31,100	$68,700

[a] See Table III-4 for construction activity code and Appendix A for priority criteria.

[b] Estimated plant cost = (1966 population served) x (factor projected to year 1990) x (unit cost per capita) x (projected 1970 FWPCA construction cost index) x (factor for engineering, legal and other fees).

[c] Estimated cost for ancillary work (interceptors, outfalls, pumping stations, etc.) = (Estimated cost of plant) x (.83).

TABLE III-7

IMMEDIATE CONSTRUCTION COSTS,
INTERSTATE WATERS, HUDSON-MOHAWK REGION,
INDUSTRIAL NEEDS THROUGH 1990

Priority [a]	No. Plants	Est. Plant Cost ($000) [b]	Estimated cost Ancillary Work ($000) [c]	Total ($000)
I	10	22,100	16,400	38,500
II	26	11,800	8,600	20,400
III	35	18,800	13,100	31,900
IV	31	6,100	3,800	9,900
	102	$58,800	41,900	$100,700

Construction Activity Code [a]				
A	16	5,200	2,600	7,800
B	8	3,000	1,500	4,500
C	21	1,000	500	1,500
D	57	49,600	37,300	86,900
	102	$58,800	41,900	$100,700

[a] See Appendix A for priority criteria and Table III-5 for construction activity code.

[b] Estimated plant cost = (1966 population equivalents x water use factor projected to year 1990) x (unit cost per capita) x (projected 1970 FWPCA construction cost index) x (factor for engineering and other fees).

[c] Estimated cost for ancillary work (process changes, segregation and collection systems, etc.) = (Estimated cost of plant) x (.50).

TABLE III-8

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK a/ - SUMMARY b/

Priority c/	Number	Population d/
Municipal, Institutional and Federal		
I	6	195,200
II	46	111,400
III	56	214,500
IV	-	-
	108	521,100
Industrial		
I	18	198,400
II	36	295,400
III	23	78,900
IV	-	-
	77	572,700
Total		
I	24	393,600
II	82	406,800
III	79	293,400
IV	-	-
	185	1,093,800 e/

a/ No intrastate waste source problems were identified in the Hudson-Mohawk Region for the states of Massachusetts, New Jersey and Vermont.

b/ See Table III-9 for listing of individual sources.

c/ See Appendix A for priority criteria.

d/ Population served for municipal sources; population for industrial sources based upon population equivalent determined on a BOD basis using an estimated daily per capita loading of 0.167 pounds of BOD per day.

e/ Total of known population served and calculated population equivalents.

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority I [c]		
A. Municipal and Institutional		
Utica	01	100.0
Cairo	01	53.0
Whitesboro	01	1.8
Yorkville	01	3.5
Altamont	04	1.4
Amsterdam	01	35.5
		195.2
B. Industrial		
Consolidated Tanning Corp.	D	10.5
Filmer Leather Co.	D	5.2
Flamglo Tanners Inc.	D	8.7
Gloversville Leather Inc.	D	10.5
Independent Leather Co.	D	15.3
Liberty Dressing Co.	D	6.9
Twin City Leather Co.	D	4.4
Wood-Hyde Leather Co.	D	17.5
F. Rulison & Sons Inc.	D	4.5
Karg Bros. Inc.	D	17.5
West End Brewing Co.	A	49.7
National Lead Co.	C	-
Rome Manufacturing Division	D	14.0
General Cable Corp.	C	-
Rome Cable Division of Alcoa	C	-
Utica Cutlery Co.	C	-
Ballston Knitting Co., Inc.	D	27.0
C. A. Durr Packing Co.	A	6.7
		198.4
		393.6
Priority II [c]		
A. Municipal and Institutional		
Cambridge	01	.5
Rome - Oneida	01	.6
Stittville	01	.3
Waterville	01	1.7
Clark Mills	01	1.2
Hinkley	01	.2

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority II [c] (Cont'd)		
A. Municipal and Institutional (Cont'd)		
Poland	01	.6
Newport	01	.9
Middleville	01	.7
Middleburg	01	.3
Hagaman	01	.2
Sand Lake	01	.5
Leeds	01	.2
Broadalbin	01	1.4
Upper Fount St. S. D.	01	.1
Herkimer City Home	01	.1
Voorheesville	01	1.3
Ellenville	01	5.0
Guilderland, McKnownville	01	2.0
Fort Plain	01	2.7
Fonda	01	1.1
Little Falls	01	9.0
Dolgeville	04	4.0
St. Johnsville	01	2.3
Minerva	01	.3
Rome	04	48.0
Clayville	01	.7
Frankfort	04	4.0
Ilion	04	10.5
Mohawk	04	3.5
Trenton	01	.4
Sand Lake (Averill Park)	01	.8
Schodack	01	.5
Bethlehem	01	.5
Philmont	01	1.8
East Chatham	01	.2
Rensselaerville	01	.3
Shandaken	01	.2
Kerhonkson	01	.8
Rosendale	01	.5
Florida	01	.3
Washingtonville	01	.8
Argyle	01	.1
Rome	01	.1
		111.2

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority II [c] (Cont'd)		
B. Industrial		
Superfine Paper Mills Inc.	D	10.3
Utica Turbine Parts Division	D	8.0
IBM	C	-
Spargo Wire Co.	C	-
Van Raalte Co.	D	56.0
Olney & Floyd, Inc.	A	13.8
Utica Brewing Co.	A	5.4
Fort Schuyler Paper	D	17.7
Special Metals Corp.	C	-
Palatine Dyeing Co.	D	22.2
Rome Strip Steel Co.	D	.9
Knox Gelatine Inc.	A	25.0
Greendell Packing Corp.	A	3.7
Columbia Corp.	D	17.5
Gloversville Continental Mills	D	5.8
H. Waterbury & Sons	D	8.5
Fulton County Silk Mills	D	10.2
Adirondack Finishing Corp.	D	13.5
Lee Dyeing Co. of Johnstown	D	20.4
Rebel Dyeing Corp.	D	5.7
Asphalt Stone Products, Inc.	C	-
Pleasant Valley Finishing Co.	D	17.0
Armour & Co.	A	1.0
Cascade Finishing Co.	D	18.0
Fowler Mohawk Corp.	D	2.8
Rondout Corp.	D	2.1
Cottrell Paper Co. Inc.	D	5.9
Chester Cable Corp.	D	-
Troy Sand and Gravel	C	-
Kimberly Clark Corp.	D	1.2
Hurley Sand and Gravel	C	-
Hollenbeck Sand and Gravel	C	-
Kraft Food Division	A	.2
Pleasant Valley Packing Co.	A	2.6
Channel Master Corp.	C	-
Ulster Knife Co.	C	-
		295.4

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority II [c] (Cont'd)		
C. Federal		
Schenectady General Depot-Guilderland	01	na
Malta Air Force Base Ballston Spa	01	.2
		.2
		406.8
Priority III [c]		
A. Municipal and Institutional		
New York Mills	04	3.4
Utica (North Plant)	04	.7
Dolgeville A	04	2.8
Dolgeville B	04	.3
Canajoharie	04	2.7
Gloversville	06	21.0
Montgomery	01	.1
Selkirk	01	.1
Valatie	01	1.3
Hamilton College S. D.	04	.9
Indian Lake	04	.8
Schroon Lake	04	.8
Warrensburg	01	2.4
Schuylerville	04	1.4
Whitestown Dunham Manor	04	1.4
Nelliston	01	.6
Schenectady	04	81.0
Indian Lake #2	04	.2
Oriskany Falls	04	1.0
Clinton	04	1.7
Clinton State Prison	04	3.0
Schoharie	04	1.1
Greenport S. D. #1	04	1.8
Guilderland, State Health Farm	04	4.5
Fultonville	04	.8
New Hartford	04	1.6
Oriskany	04	6.0
Caldwell	01	.1
New Hartford, Castle Estates	04	.3
Herkimer	04	9.0
Cobleskill	04	3.5

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS. HUDSON-MOHAWK REGION,
NEW YORK STATE (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority III [c] (Cont'd)		
A. Municipal and Institutional (Cont'd)		
Colonie, Lutham S. D.	04	2.7
Otisville, State Dept. of Social Welfare	04	.6
Warwick, Training School	04	.5
Cornwall S. D. #1	02	2.5
Whitesboro, Central School	04	.2
Palatine Bridge	04	.6
Alplaus S. D.	04	.6
Richmondville	04	.8
Colonie School Rd. S. D.	06	5.4
Pinchill	02	1.5
Warwasing State Dept. of Correction	04	1.0
Shawangunk State Dept. of Correction	04	.5
Millbrook	02	1.3
Dutchess - Green Haven	04	2.1
Maybrook	02	1.3
Warrensburg Central High School	04	1.0
Averill Park	01	.7
Amsterdam	04	.1
Scotia	04	10.0
Saratoga Springs	05	15.0
Deerfield, Broadacres	04	.3
Sacandaga	04	.5
Sharon Springs	06	8.0
Sacandaga Park	04	.6
Fishkill, Dutchess Park	04	.4
		214.5
B. Industrial		
Bendix Corp.	D	.4
Dairymen's League Co-op Assoc.	A	.1
Beaunit Corp.	D	9.0
Fort Plain Packing Co.	A	1.6
Sonoco Products	D	11.5
Looman Packers	A	1.6
Prince High Rock Mills Inc.	D	1.9
Landsman Packing Co.	A	2.2
Borden Foods	A	1.8
Burrows Paper Corp.	D	3.7

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE (Cont'd)

Source	Construction Activity Code [a]	Population Served (000) [b]
Priority III [c] (Cont'd)		
B. Industrial		
Beech Nut Life Savers Inc.	B	30.0
Clermont Fruit Packers	A	.3
Northeast Fruit Growers Corp.	A	1.0
Saratoga Dairy Inc.	A	.7
Schenectady Chemical Inc.	B	5.3
Eagle Mills	A	.3
Salada Junket Division	D	3.8
Proper Maid Silk Mfg. Co.	D	2.2
Sealtest Foods	A	1.0
Bellevue Dairy	A	.2
Greens Ice Cream Corp.	A	.2
Condec Corp.	D	.1
General Electric	C	-
		78.9
		293.4
	TOTAL	1,093.8 [d]

[a] See Tables III-11 and III-12 for definitions of Construction Activity Codes.

[b] Population Served for industrial sources based upon the population equivalent determined on BOD basis.

[c] See Appendix A for Priority Criteria.

[d] Total of known population served plus calculated population equivalents.

na = data not available.

TABLE III-10

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK [a] - SUMMARY [b]

Construction Activity Code [c]	Number	Population [d]
Municipal, Institutional and Federal		
01	53	240,500
02	4	6,600
04	47	224,600
05	1	15,000
06	3	34,400
	108	521,100
Industrial		
A	21	119,100
B	2	35,300
C	14	-
D	40	418,300
	77	572,700
TOTAL		1,093,800 [e]

[a] No intrastate waste source problems were identified in the Hudson-Mohawk Region for the states of Massachusetts, New Jersey and Vermont.

[b] See Tables III-11 and III-12 for listing of individual sources.

[c] See Tables III-11 and III-12 for identification of construction activity code.

[d] Population served for municipal sources; population for industrial sources based upon the population equivalent determined on a BOD basis using an estimated daily per capita loading of 0.167 pounds of BOD per day.

[e] Total of known population served and calculated population equivalents.

TABLE III-11

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE, MUNICIPAL NEEDS

Code 01: Discharging raw sewage. Build secondary plant.

Waste Source	Population Served (000)
New York	
Utica	100.0
Cairo	53.0
Whitesboro	1.8
Yorkville	3.5
Amsterdam	35.5
Cambridge	.5
Rome - Oneida	.6
Stittville	.3
Waterville	1.7
Clark Mills	1.2
Hinkley	.2
Poland	.6
Newport	.9
Middleville	.7
Middleburg	.3
Hagaman	.2
Sand Lake	.5
Leeds	.2
Broadalbin	1.4
Upper Fount St. S. D.	.1
Herkimer City Home	.1
Vooheesville	1.3
Ellenville	5.0
Guilderland, McKnownville	2.0
Fort Plain	2.7
Fonda	1.1
Little Falls	9.0
Trenton	.4
St. Johnsville	2.3
Minerva	.3
Clayville	.7
Sand Lake (Averill Park)	.8
Schodack	.5
Bethlehem	.5
Philmont	1.8
E. Chatham	.2
Rensselaerville	.3

TABLE III-11

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE, MUNICIPAL NEEDS (Cont'd)

Code 01: Discharging raw sewage. Build secondary plant. (Cont'd)

Waste Source	Population Served (000)
New York (Cont'd)	
Shandaken	.2
Kerhonkson	.8
Rosendale	.5
Florida	.3
Washingtonville	.8
Argyle	.1
Rome - Stanmir	.1
Montgomery	.1
Selkirk	.1
Valatie	1.3
Warrensburg	2.4
Nelliston	.6
Caldwell	.1
Averill Park	.7
Schenectady General Depot, Guilderland	na
Ballston Spa - Malta AFB	.2
	240.5

Code 02: Not suitable for upgrading to secondary. Build new primary and upgrade to secondary.

Waste Source	Population Served (000)
New York	
Cornwall S. D. #1	2.5
Pinchill	1.5
Millbrook	1.3
Maybrook	1.3
	6.6

Code 04: Suitable for upgrading. Build new secondary facilities.

Waste Source	Population Served (000)
New York	
Altamont	1.4
Dolgeville	4.0

TABLE III-11

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE, MUNICIPAL NEEDS (Cont'd)

Code 04: Suitable for upgrading. Build new secondary facilities. (Cont'd)

Waste Source	Population Served (000)
New York (Cont'd)	
Rome	48.0
Frankfort	4.0
Ilion	10.5
Mohawk	3.5
New York Mills	3.4
Utica (North Plant)	.7
Dolgeville A	2.8
Dolgeville B	.3
Canajoharie	2.7
Hamilton College S. D.	.9
Indian Lake	.8
Schroon Lake	.8
Schuylerville	1.4
Whitestown Dunham Manor	1.4
Schenectady	81.0
Indian Lake #2	.2
Oriskany Falls	1.0
Clinton	1.7
Clinton State Prison	3.0
Schoharie	1.1
Greenport S. D. #1	1.8
Guilderland, State Health Farm	4.5
Fultonville	.8
New Hartford	1.6
Oriskany	6.0
New Hartford, Castle Estates	.3
Herkimer	9.0
Cobleskill	3.5
Colonie, Latham S. D.	2.7
Otisville, State Dept. of Social Welfare	.6
Warwick Training School	.5
Whitesboro Central School	.2
Palatine Bridge	.6
Alplause S. D.	.6
Richmondville	.8

TABLE III-11

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE, MUNICIPAL NEEDS (Cont'd)

Code 04: Suitable for upgrading. Build new secondary facilities. (Cont'd)

Waste Source	Population Served (000)
New York	
Warwasing State Dept. of Correction	1.0
Shawangunk State Dept. of Correction	.5
Dutchess - Green Haven	2.1
Warrensburg Central H. S.	1.0
Amsterdam	.1
Scotia	10.0
Deerfield, Broadacres	.3
Sacandaga	.5
Sacandaga Park	.6
Fishkill, Dutchess Park	.4
	224.6

Code 05: Intermediate plant suitable for upgrading. Build new secondary facilities.

Waste Source	Population Served (000)
New York	
Saratoga Springs	15.0
	15.0

Code 06: Condition good - if overloaded build secondary for overload only.

Waste Source	Population Served (000)
New York	
Gloversville	21.0
Colonie School Rd. S. D.	5.4
Sharon Springs	8.0
	34.4
TOTAL	521.1 a/

a/ Total of known population served.

na = data not available

TABLE III-12

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, HUDSON MOHAWK REGION,
NEW YORK STATE, INDUSTRIAL NEEDS

Code A: Provide secondary treatment or equivalent including chlorination.

Waste Source	Population Equivalent (000)
New York	
W. End Brewing Co.	49.7
C. A. Durr Packing Co.	6.7
Olney & Floyd, Inc.	13.8
Utica Brewing Co.	5.4
Knox Gelatin, Inc.	25.0
Greendell Packing Corp.	3.7
Armour & Co.	1.0
Kraft Food Division	.2
Pleasant Valley Packing Co.	2.6
Dairymen's League Co-Op Association	.1
Fort Plain Packing Co.	1.6
Looman Packers	1.6
Landsman Packing Co.	2.2
Borden Foods	1.8
Clermont Fruit Packers	.3
NE Fruit Growers Co-Op	1.0
Saratoga Dairy, Inc.	.7
Eagle Mills	.3
Sealtest Foods	1.0
Belleville Dairy	.2
Greens Ice Cream Corp.	.2
	119.1

Code B: Provide secondary treatment or equivalent.

Waste Source	Population Equivalent (000)
New York	
Beech-Nut Life Savers, Inc.	30.0
Schenectady Chemical, Inc.	5.3
	35.3

Code C: Provide for segregation and separate treatment of one or more type waste.

Waste Source	Population Equivalent (000)
New York	
National Lead Co.	-
General Electric	-

TABLE III-12

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE, INDUSTRIAL NEEDS (Cont'd)

Code C: Provide for segregation and Separate treatment of one or more type waste. (Cont'd)

Waste Source	Population Equivalent (000)
New York (Cont'd)	
General Cable Corp	-
Rome Cable Division of Alcoa	-
Utica Cutlery Co.	-
IBM	-
Spargo Wire Co.	-
Special Metals Corp.	-
Asphalt Stone Products Inc.	-
Troy Shad & Gravel	-
Hurley Sand & Gravel	-
Hollenbeck Sand & Gravel	-
Channel Master Corp.	-
Ulster Knife Co.	-
	-

Code D: Same as C; with biological treatment for all or part of the Waste load, including chlorination.

Waste Source	Population Equivalent (000)
New York	
Consolidated Tanning Corp.	10.5
Filmer Leather Co.	5.2
Flamglo Tanners Inc.	8.7
Gloversville Leather, Inc.	10.5
Independent Leather Co.	15.3
Liberty Dressing Co.	6.9
Twin City Leather Co.	4.4
Wood-Hyde Leather Co.	17.5
F. Rulison & Sons, Inc.	4.5
Karg Bros., Inc.	17.5
Rome Manufacturing Division	14.0
Ballston Knitting Co., Inc.	27.0
Superfine Paper Mills Inc.	10.3
Utica Turbine Parts Division	8.0
Van Raalte Co.	56.0
Fort Schuyler Paper	17.7
Palatine Dyeing Co.	22.2
Rome Strip Steel Co.	.9
Columbia Corp.	17.5

TABLE III-12

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, HUDSON-MOHAWK REGION,
NEW YORK STATE, INDUSTRIAL NEEDS (Cont'd)

Code D: Same as C; with biological treatment for all or part of the Waste load, including chlorination. (Cont'd)

Waste Source	Population Equivalent (000)
New York (Cont'd)	
Gloversville Continental Mills	5.8
H. Waterbury & Sons	8.5
Fulton County Silk Mills	10.2
Adirondack Finishing Corp.	13.5
Lee Dyeing Co. of Johnstown	20.4
Rebel Dyeing Corp.	5.7
Pleasant Valley Finishing Co.	17.0
Cascade Finishing Co.	18.0
Flowler Mohawk Corp.	2.8
Rondout Corp.	2.1
Cottrell Paper Co., Inc.	5.9
Chester Cable Corp.	-
Kimberly Clark Corp.	1.2
Bendix Corp.	.4
Beaunit Corp.	9.0
Sonoco Products	11.5
Prince High Rock Mills, Inc.	1.9
Burrows Paper Corp.	3.7
Salada Junket Division	3.8
Paper Maid Silk Mfg. Co.	2.2
Condec Corp.	.1
	418.3
TOTAL	572.7 a/

a/ Total of calculated population equivalents.

TABLE III-13

IMMEDIATE CONSTRUCTION COSTS, INTRASTATE WATERS,
HUDSON MOHAWK REGION, NEW YORK STATE [a]
MUNICIPAL NEEDS THROUGH 1990

Priority [b]	No. Plants	Est. Plant Cost ($000) [c]	Estimated Cost Ancillary Work ($000) [d]	Total ($000)
I	6	9,600	8,000	17,600
II	46	9,000	7,500	16,500
III	56	11,900	9,900	21,800
IV	-	-	-	-
	108	$30,500	25,400	$55,900

Construction Activity Code [b]				
01	53	16,800	14,000	30,800
02	4	1,000	800	1,800
04	47	10,800	9,100	19,900
05	1	300	200	500
06	3	1,600	1,300	2,900
	108	$30,500	25,400	$55,900

[a] No intrastate waste source problems were identified in the Hudson-Mohawk Region for the states of Massachusetts, New Jersey and Vermont.

[b] See Table III-11 for construction activity code and Appendix A for priority criteria.

[c] Estimated plant cost = (1966 population served x factor projected to year 1990) x (unit cost per capita) x (projected 1970 FWPCA construction cost index) x (factor for engineering, legal and other fees).

[d] Estimated cost for ancillary work (interceptors, outfalls, pumping stations, etc.) = (Estimated cost of plant) x (.83).

TABLE III-14

IMMEDIATE CONSTRUCTION COSTS, INTRASTATE WATERS,
HUDSON-MOHAWK REGION, NEW YORK STATE,
INDUSTRIAL NEEDS THROUGH 1990

Priority [a]	No. Plants	Est. Plant Cost ($000) [b]	Estimated Cost Ancillary Work ($000) [c]	Total ($000)
I	18	11,900	8,300	20,200
II	36	17,500	12,200	29,700
III	23	7,300	4,500	11,800
IV	-	-	-	-
	77	$36,700	25,000	$61,700

Construction Activity Code [a]				
A	21	8,000	4,000	12,000
B	2	1,800	900	2,700
C	14	1,100	700	1,800
D	40	25,800	19,400	45,200
	77	$36,700	25,000	$61,700

[a] See Appendix A for priority criteria and Table III-12 for Construction Activity Code.

[b] Estimated plant cost = (1966 population equivalents x water use factor projected to year 1990) x (unit cost per capita) x (projected 1970 FWPCA construction cost index) x (factor for engineering and other fees).

[c] Estimated cost for ancillary work (process changes, segregation and collection systems, etc.) = (Estimated cost of plant) x (.50).

IV - OTHER MANAGEMENT AND RESEARCH NEEDS

STREAM SURVEILLANCE PROGRAMS

To effectively accomplish the objectives of a water quality management program designed to protect and enhance prime water usages as established by State authorities, it is necessary that adequate stream surveillance programs be established. Such programs should include a network of manual and utomated sampling stations which permit the collection, evaluation and dissemination of water quality data, so as to present a clear picture of conditions in any section of the Hudson-Mohawk Region. These monitoring stations should be strategically situated near major wastewater sources so as to alert pollution control authorities to irresponsible or accidental discharge of harmful material. Hence, appropriate corrective actions can be taken immediately.

A surveillance program for New York State waters was established by the New York State Health Department in 1962. Since its inception, and aided by the Pure Waters Program Funds made available in 1966, the New York program has developed an elaborate network of manual and automated sampling stations. New Jersey has established a network of some 200 stream water quality stations throughout the state. These are sampled regularly four times a year. An expansion of the network and the installation of automated monitoring equipment would greatly enhance the state's stream surveillance program. The States of Vermont, and Massachusetts have yet to develop an effective surveillance program. There is an immediate need for these States to establish a system of manual and automated sampling and monitoring stations.

STORAGE AND STREAM FLOW REGULATION

The Federal Power Commission reports (1965) the existence of 50 hydroelectric installations with a total 400,000 KW capacity and plans for constructing 18 more with 2,000,000 KW capacity.

In general, the water storage from these hydroelectric plants is not available for the augmentation of stream flow during critical low flow periods. In addition, many of the structures are operated for peak power only, with no flow other than leakage allowed through the dam during non-generating periods. As a result, downstream flows are seriously limited in time. There is a need to balance all water resource activity to provide adequate flow and quality in the streams.

Comprehensive basin-wide studies are needed to establish sound plans designed to permit such a balance between other beneficial water uses and power development. Such studies should determine the minimum flows required to provide adequate water supply, meet irrigation needs, effect pollution control and enhance recreational development. Following these determinations, plans should be developed to coordinate flow releases so as to meet these needs.

OPERATION AND MAINTENANCE

An adequate program of operation and maintenance at waste treatment plants is necessary to ensure that the existing and recommended new municipal and industrial treatment facilities will be effective in maintaining adequate water quality.

Adequate operation of treatment plants requires qualified resident personnel, proper laboratory control, and accurate record keeping. State, interstate and Federal agencies must provide programs aimed at ensuring these three factors are included at each plant. Because of the limited supply of qualified operating personnel, there is an urgent need for both long and short term training courses in treatment plant operation. Such training should be continuous, and should lead to state licensing of operators. Federal grants to aid the states in meeting their responsibility for the training of qualified personnel should be made available. Federally sponsored and conducted training programs should also be established to assist in the training of personnel. In order to ensure the successful implementation of any operation and maintenance program, the states must have a sufficient number of trained inspectors to periodically visit plants to review operation and laboratory control methods, and to provide technical assistance to plant personnel.

In recent years, New York State has taken positive action to upgrade plant performance by improving operation and maintenance. Legislation enacted in 1964 established a fund which provides for the payment to municipalities of one-third the cost of operation and maintenance of adequate treatment plants. To qualify, municipalities must have standard operating reports which show performance and laboratory test data, a qualified operator in charge of the plant and the collection and conveyance system must minimize the amount of untreated waste discharged.

New Jersey regulations require that licensed personnel operate and maintain all sewage treatment facilities in the state. Because of the shortage of qualified personnel, the state has recently launched training programs at several state and county colleges. These programs are aimed at those individuals interested in becoming licensed operators of treatment facilities. Other advanced courses designed to broaden the knownledge of experienced operators and provide basic understanding of new technological advances in the field will also be presented.

Vermont has no legal requirements governing plant operation and maintenance. In 1960 the state legislature instituted an inspection program, but this requires only a once yearly inspection of plants within the State. There is no legal requirement for licensing of plant operators, although operators are urged to become certified by the New England Water Pollution Control Federation.

SPECIAL STUDIES AND SURVEYS

Municipal and Industrial Waste Inventory

A review of the available data on location, volumes and characteristics of existing municipal and industrial waste discharges with-

in the Region indicates the need for more adequate information. The information contained in this report should be validated, in many cases requiring field surveys. In addition, once an adequate base inventory has been established, there is a need to maintain the data current. The states should develop adequate records providing the latest information on all waste loads for use in planning, and determination of further pollution abatement needs.

Septic Tank Survey

Within the Hudson-Mohawk Region there are an estimated 1,000,000 persons who dispose of domestic wastes by individual septic tanks or cesspools. There are no adequate data indicating the pollution effects of such systems. Studies should be conducted to determine the following:

1. Location of those areas with large numbers of septic tank systems.

2. Determination of the effects such systems have on surface and groundwater.

3. A plan for eliminating inadequate individual disposal systems by connection to existing or new municipal collection systems. Planning of such systems should be based on regional, inter-county and inter-municipal areas.

While the first two items could be accomplished by the Federal Water Pollution Control Administration in cooperation with State and Federal agencies, the third item is the responsibility of State and local government. Existing Federal grant programs could be used to accelerate the planning, design, and construction of such regional collection systems.

Thermal Pollution

With the growth in thermonuclear power plants and continuing increase in industrial cooling water usage, pollution of these waters by heat may become a critical problem. All existing sources of thermal pollution should be identified and determinations made of their effects on the aquatic environment. Plans for new facilities should include provision for cooling towers or other means to prevent discharge of heated wastes.

Stormwater Overflow and Urban Runoff

Within the Hudson-Mohawk Region there are 43 municipal sewerage systems that have, at least in part, combined storm and sanitary sewage collection. There is a need to determine the quality and quantity of overflows from such systems, the extent to which such overflows degrade water quality, and similarly, the magnitude and effects of urban runoff directly to the receiving waters.

Boat Pollution

There is a need to determine the magnitude of the problem associated with the discharge of litter, sewage, and oil from the large numbers of watercraft in the Region. Investigations should include research to develop practical means of controlling this source, surveys to determine the need for adequate disposal facilities at marinas, and a determination of adequate legislation to control such pollution. Both the States of New York and New Jersey have legislation governing the discharge of wastes from vessels. The other states have no specific legislation.

Agricultural Runoff

There are no data available to indicate the extent of water pollution attributable to agricultural runoff. Since runoff from cultivated fields may convey fertilizers, herbicides and pesticides to the receiving waters, the potential dangers of such pollution require a thorough investigation. Such a study should include a determination of the types and amounts of agricultural chemicals being used, analytical data to measure the concentration of these chemicals in the receiving streams, and research into allowable concentrations and adequate control measures.

Survey of Camping Facilities

Since there are no data to determine the effects of wastes from the increasing number of camping sites, a survey should be made to determine the number and location of such sites, the type of treatment facilities provided, and the magnitude of water quality problems attributable to this source.

Water Quality Studies

The data included in Section VI indicate the extent to which existing water quality data are inadequate. Necessary field and laboratory sampling and analyses must be conducted to provide adequate data on existing water quality. Such information will not only confirm suspected problem areas and locate those areas with problems as yet unknown, but will establish a base against which future changes in water quality can be measured.

Aquatic Plants and Nutrients

Many areas within the Hudson-Mohawk Region are plagued by dense growths of aquatic weeds and algae to the extent that interference with beneficial water use results. There is a need for a survey to determine the extent and location of such plant growths, the determination of contributing causes and the development of programs to control the problem. Such control programs should include reduction in the quantities of nutrient materials discharged to the waters as well as means of physical removal of dense plant growths.

Advanced Waste Treatment

Greater emphasis should be placed on the application of advanced waste treatment techniques, particularly in those areas where the discharge of secondary waste treatment effluent into small receiving waters results in degradation of water quality. The application of such advanced treatment techniques should be considered for both municipal and industrial wastes.

Dredging

Since extensive dredging activities are carried out in the Hudson-Mohawk Region, particularly in the Hudson River, studies should be made to determine the extent such operations are affecting water quality. These investigations should result in the formulation of plans which will help coordinate dredging activities with water resource management and provide guidelines and practices to be followed by dredging operations.

Data Systems

With the increasing tempo of data collection by a number of agencies at all levels of government, there is a need for an integrated system of handling water quality and water use data within the Region. Such a system, which might be based on the existing Federal Water Pollution Control Administration STORET program, would make possible better interchange of knowledge and eliminate duplication of studies. Such an integrated system would further be of great value in permitting the application of such techniques as mathematical modelling and systems analysis in the development of overall water quality management programs.

Regional Cooperation

A review of water quality problems and water needs within the Hudson-Mohawk Region points out the interrelationship throughout the entire Region. There is a need for close coordination and water quality management to ensure that on-going and future programs consider not only the immediate locality but also the effects upon the Region as a whole. Studies recommending the creation of regional authorities must ensure that the needs of the smaller river basins are represented, weighed and/or integrated into the regional water management programs. Regional authorities may well be the operating mechanism best composed to promote inter-local cooperation between municipalities to coordinate planning among townships and counties, and to administer State and Federal programs.

Legal Framework

To ensure that adequate water pollution control programs can be formulated and implemented, there is a need to evaluate existing

legal mechanisms and institutional arrangements to determine their adequacy to deal with water quality problems on both local and a regional basis. At the present time there is a lack of data on the adequacy of existing framework, as well as a lack of information on the interrelationships between various authorities and governmental agencies in dealing with the problem of resource management. In a number of localities there is a requirement for additional legislation to zone present and future shoreline developments.

Financial Arrangements

Investigations must be carried out to determine the amount of financial participation each basin entity (government and private) should produce to meet expenditures required for immediate and long range pollution control programs. The role of Federal, State, local and private bodies must be evaluated in terms of cost and benefits to give an indication of the economic impact of water pollution control programs and their effects upon the Region as a whole. Such problems as competition between various public works programs such as highways, education, and water pollution control must be evaluated to ensure that programs aimed at achieving water quality management receive a proportionate share of total public and private expenditures.

Miscellaneous Studies

In addition to the outline of studies listed above there is a need to survey a variety of other existing pollutional sources and potential problem areas.

V - RECENT PROGRESS IN POLLUTION CONTROL

INTERSTATE ACTION

New York, Massachusetts and Vermont are signatory members of the New England Interstate Water Pollution Control Commission. This Commission serves as a coordinating body for the adoption of stream classifications by member states, and to further the technical aspects of water pollution control through exchange of information by the Technical Advisory Board as well as through the mechanism of research contracts. Of particular note are research studies on the problems of textile wastes done under contract with the Commission.

VERMONT

Since the enactment of enabling legislation in 1949, the State of Vermont has carried out its water pollution control program through the Water Resources Board and the State Department of Water Resources. The State has underway a classification program setting forth best future water use for each stream together with treatment requirements.

Recent legislation in Vermont has increased the state construction grants from 20 to 30% of the cost of municipal waste facilities. Vermont has also instituted a program of incentive grants to provide additional funds beyond those authorized by the conventional state construction grant for those municipalities with a limited economic base which are required to construct waste treatment facilities by the Vermont Water Resources Board. To speed up the classification program, the legislature enacted a law providing that after January 1, 1969, all waters in the state shall be at least Class "C" quality, unless a permit is granted by the Water Resources Board allowing a lesser quality. (Class C waters are defined suitable for fish and wildlife habitat; recreational boating, and industrial processes and cooling; under some conditions, acceptable for public water supply with appropriate treatment; good aesthetic value).

State law requires an annual inspection by the Department for each municipal treatment plant, but does not include industrial plants. There are no requirements for licensing of treatment plant operators, but voluntary registration through the New England Water Pollution Control Association is urged. There is a need for state legislation requiring official certification and licensing of operators.

Stream surveillance work in Vermont has been limited to studies necessary for the adoption of stream classifications and on an annual basis at selected lakes and ponds. There is a need for additional funds and manpower to increase the surveillance program so as to ensure compliance with classifications, once adopted.

NEW YORK

In 1965, the State of New York completed a comprehensive survey of its pollution abatement needs. This initial survey showed that more than

100 municipalities provided no treatment, and an additional 43 communities provided "inadequate treatment". This survey also indicated that the most important pollution control challenge in New York State is the need for control of industrial wastes.

In August 1965, the State Health Department adopted new treatment requirements which prescribe minimum treatment levels for each class of water. The policy also requires that wastes must be treated on the basis of the highest downstream classification and not merely the classification of the immediate receiving water. Under this policy treated wastes must meet the following requirements:

Classification	Minimum Required Treatment
AA	Tertiary Treatment and Chlorination
A & B	Secondary Treatment and Chlorination
C	Secondary Treatment
D	Primary Treatment. Secondary treatment where these waters adversely affect downstream waters of higher classification.

In November of 1965 New York State enacted a Pure Waters Act with an accompanying 1.7 billion dollar program for water pollution control. The principal features of this Act included:

1. A one billion dollar fund to pre-finance Federal construction grant money so as to make possible total State and Federal grants of 60% of the cost of treatment plants, outfalls and interceptors.

2. Tax incentives to increase pollution control activities by industry.

3. Payment of one-third of the operation and maintenance costs of municipal plants providing adequate treatment.

4. Established an automated water quality monitoring network throughout the State.

5. Provides accelerated enforcement procedures.

6. Establishes a program to control waste discharges from State installations.

7. Promotes basic and applied research.

During the 1966 legislative session the State passed additional statutes to further the water pollution control program. These new laws included the following provisions:

1. Municipalities under orders by the State Health Department are denied the right of referendum on bond issues for the construction of treatment facilities.

2. Cities are permitted to anticipate future waste control needs in the purchase of land and in the construction of treatment plants, to provide capacity for future growth.

3. Bacteriological standards were set for waters used for potable water supply and bathing and for streams that traverse urbanized areas. This statute requires higher treatment efficiencies when coliform counts in the receiving water reach specified maxima.

4. Local authorities were given enforcement power to abate wastes from individual homes and small businesses.

5. Regulations were established to control pollutional discharges from boating.

6. Both municipalities and industries must maintain records on the quantity and quality of waste discharges and must make these records available to the Commissioner of Health. This law also prohibited the use of any existing or new outlet for waste discharge unless such use complies with all rules and regulations of the State Health Department.

7. An authorization for injunctive action when a violation of water pollution control law occurs.

8. Local financing laws were liberalized to encourage greater local initiative in construction of waste treatment facilities.

New York State is having a mathematical model made to describe water quality of the Hudson River from Glens Falls to the Battery.

NEW JERSEY

Although the State of New Jersey has strong statutes relating to water pollution control and has had them tested and upheld in the highest State courts, their implementation has not kept pace with the problems. Generally, State enforcement has been weak and selective.

During 1966 the Governor's office undertook a comprehensive review and evaluation of the State's administration of water pollution control programs. In a recent message to the legislature, the Governor proposed a greatly expanded management program that calls for a marked increase in personnel and requests higher compensation, in order that competent people will be attracted to State service.

Highlighted below are several practical measures broadening the State's role in water pollution control.

The State of New Jersey has established a stream classification program. In August 1964, the Department of Health promulgated formal rules and regulations, including water quality criteria, establishing classifications to be assigned to the waters of the State. These rules and regulations constitute the basis for classification of the various individual watersheds. The classifications are administrative tools designed to augment the existing statutes.

Classifications for each river basin are proposed by the Department based on recommendations made by an inter-departmental committee established by the Department and the State Department of Conservation and Economic Development. Following public hearings, formal classifications will be issued for each major watershed in the Region.

After classification, the Department promulgates regulations specifying the minimum degree of treatment required to comply with the classifications and issues appropriate orders against violators.

The State Public Sanitary Sewerage Facilities Act of 1965 authorizes the Commissioner of Health to make grants and loans to local governmental units for the preparation of feasibility studies on the engineering design of public sanitary sewerage facilities. The law declares that it is the public policy of the State, "to encourage and support, as hereinafter provided, the promotion, planning, development and construction of public sanitary sewerage facilities, including collection, transmission, treatment and disposal works on a regional or multi-unit basis."

Grants are authorized for the purpose of preparing feasibility studies and reports on projects for the collection, treatment and disposal of sewage involving two or more local governmental units, acting together on a joint basis.

Loans are authorized for the preparation of preliminary engineering plans, detail design, engineering drawings and specifications, and contract documents for the construction of a new, or expansion of an existing, sewerage facility provided a feasibility study or a report upon the facility has been filed with and approved by the Commissioner.

This act became effective July 1, 1965 with $1,000,000 appropriated for carrying out the grant and loan provisions. An additional $4,000,000 was appropriated for Fiscal Year 1967.

The County Sewerage Financing Law (Chapter 205) passed in 1966, permits counties, separately or jointly with municipalities located within the county (1) to construct or acquire sewage disposal facilities or sanitary sewers, (2) to operate such facilities, and (3) to furnish the services of these facilities to any municipality within the county.

The law also authorizes a county (1) to issue general obligation bonds to finance the construction or acquisition of such facilities, (2) to fix and collect fees for the facilities and services furnished, (3) to accept grants and gifts, and (4) to enter into contracts and carry out other business necessary to the operation of these facilities.

This law is designed to supplement the "Sewerage Authorities Law." It specifically restricts a county from establishing any sewage disposal system, however, that would be competitive with a county sewerage or municipal utilities authority previously established under existing legislation, without the consent of such existing authority.

MASSACHUSETTS

Massachusetts recently established a Water Resources Commission, and transferred to it those responsibilities pertaining to streams which had previously been the care of the State Health Department. Stream surveillance sampling has not yet been initiated.

FEDERAL

Federal Water Pollution Control Administration resources have been employed in a number of instances to investigate and abate pollution in the Hudson-Mohawk Region. In addition to the activity of the construction grants program a number of laboratory and field studies have been undertaken.

A field survey of Moodna Creek (tributary to the Hudson River) showed low dissolved oxygen levels and putrefied bottom deposits.

Major wastewater discharges on the Hoosic River were examined by project personnel with state authorities.

A water quality study of the New York State Barge Canal System was carried out.

A salinity study of the Hudson River from Troy locks to the mouth yielded salinity data which is being used to help construct a mathematical model. A diffusion and tidal current study was also carried out in the same stretch.

At the request of the governors of New York and New Jersey, the FWPCA called a conference on the matter of pollution of the interstate waters of the Hudson River below Troy. The findings of the first conference held on September 28, 29 and 30, 1965 are contained in Appendix D.

On-going studies by the Corps of Engineers including the North Atlantic Regional Framework Study and the Northeast Water Supply Study

are aimed at providing broad based survey data on both present and future water resource problems within the Hudson-Mohawk Region. Both of these studies involve a number of Federal agencies, as well as the water pollution control and water resource agencies of the several states.

VI - BACKGROUND FOR RECOMMENDATIONS

KNOWN WATER QUALITY PROBLEMS

To determine the extent that municipal, industrial and other waste discharges have affected the quality and use of the Hudson-Mohawk Region waters, an evaluation was made, based on existing data from limited Project field surveys, State reports and records, and the New England-New York Inter-Agency Committee Report. Analytical data were compared with parameter values regarded as acceptable for such water uses as water supply, recreational bathing and boating, and sport fishing. The following streams and water bodies, arranged by river basin, were found to have water quality below that required for the expected water uses. Specific problems and those areas requiring further study are also indicated.

Upper Hudson River Basin

Upper Hudson River

Water quality of the northern reaches of the Hudson River, from its headwaters to the Town of Corinth, is generally satisfactory and considered suitable for existing uses. However, localized pollutional problems include high coliform density levels, low dissolved oxygen concentrations and high BOD. Such conditions have generally occurred below the wastewater discharges of population and industrial centers located along the banks of the River. Some municipal and industrial facilities that may be contributing to local degradation of this stretch of the river are the National Lead Company at Tahawas; the raw, unchlorinated domestic discharges of the communities of North Creek and Lake Luzerne, and Hadley's primary unchlorinated effluent. Several polluted tributaries (principally Schroon River) also impair the River's water quality at their confluence with the Hudson.

There are significant water quality problems in the region of the Upper Hudson River between Corinth and Waterford. Both municipal and industrial wastewater discharges have resulted in a serious degradation of these waters. There are ten municipal facilities and at least 15 industrial firms discharging their respective wastes into this 50 mile stretch of river. These waste loads combine to elevate the coliform density level to the highest point along the upper river. There are also significant reductions of dissolved oxygen and high BOD levels. The major contributors to pollution in this Region are eight paper and pulp plants which are located in the vicinities of Corinth (1), Glens Falls - Fort Edward (3), Thompson (1) Mechanicville (2) and Waterford (1). The largest of these plants are the Finch Pruyn and Company in Glens Falls and the West Virginia Pulp and Paper Mill at Mechanicville. The computed waste load from these two facilities represents approximately 35 percent of the total Mohawk-Hudson Region's industrial loading. One industry, the Imperial Color and

Chemical Corporation is believed to be discharging toxic materials into the Hudson. The Waterford, Fort Edward, and Stillwater municipal plants discharge raw, unchlorinated domestic wastes. The remaining seven municipal facilities which provide primary treatment may also be contributing pollutional material to this Region.

Schroon River

The Schroon River is characterized by depressed dissolved oxygen, high coliform densities, and high BOD. Sludge buildup has also been observed in many places. The papermaking and sanitary wastes from the Warrensburg Board and Paper Company and raw, unchlorinated domestic discharge of the community of Warrensburg are believed to be the major causes of these conditions. There are also several small towns with collection and/or treatment systems and individual institutional and housing units serviced by septic tanks which may also be contributing to the degradation of these waters.

Sacandaga River and Reservoir

Available data indicate that domestic waste discharges pollute the Sacandaga River and Reservoir. High BOD and high coliform levels have generally been recorded near the discharge points of the Sacandaga Park and Sacandaga Town primary treatment facilities and the untreated collection systems of Broadalbin. In addition, some water discoloration and sedimentation problems have been noted in the river north of Northville. It is believed that local gravel washing operations are causing this localized condition. Septic tank seepage from the many small vacation cabins and housing units located in the areas surrounding the lake and along the river, and waste discharges from recreational boating activities may also be affecting water quality. Additional investigation is required to delineate the effect each of these sources have on water quality of these waters.

Batten Kill

The waters of the Batten Kill are being adversely affected by domestic and industrial discharges. Available data indicate high coliform levels, increased BOD and corresponding depressed dissolved oxygen concentrations. Water quality degradation is particularly evident below Greenwich where the raw unchlorinated domestic wastes of the city of Greenwich and papermaking wastes from four paper plants are discharged into the river. Increased BOD in the upper reaches of the river below the primary treatment facilities of the town of Manchester have also been noted. Additional study to accurately determine to what extent municipal and industrial wastewater discharges are affecting these waters is required.

Kayaderosseras Creek

Kayaderosseras Creek is characterized by high BOD, depressed dissolved oxygen and high bacterial counts. The wastewater discharges from the Ballston Knitting Company at Ballston and the Cottrell Paper Company at Rock City Falls are suspected of being the major causes of water quality degradation. The secondary treatment facility at Ballston Spa and the primary plant at Saratoga Springs Air Force Base which do not chlorinate their effluents may also adversely affect these waters. Additional study in this area is required.

Hoosic River

High BOD and coliform counts, low dissolved oxygen levels, sludge banking (particularly at Hoosick Falls) and high pH values indicate pollution of the Hoosic River. These waters have also been found to contain substances that will support luxurious algae growths. The raw, unchlorinated domestic waste discharges from Adams, Clarksburg and Williamstown, Massachusetts, and Hoosick Falls, Valley Falls and Hempstreet Park, New York contribute to the degradation of these waters. At least eight industrial firms also adversely affect the Hoosic River. These discharge large quantities of organic material, suspended solids, and color producing substances. The Pownal Tanning Company is also believed to be adding oils, greases, toxic material, metals and bacteria to these waters. Warren Wire may also be releasing oils and toxic materials. Other factors that may be affecting these waters are septic tank seepage and low flow conditions. Additional studies are needed.

Little Hoosic River

There is evidence that water quality of the Little Hoosic River is characterized by high BOD and high bacterial levels. Additional study must be made to accurately identify the pollutional sources affecting these waters.

Walloomsac River

Data available indicate that the Walloomsac River is being polluted by municipal and industrial wastewater discharges. This condition may be caused by the effluent from the primary treatment plant at Bennington and the industrial firms of Fair Dale Farms and Vermont Tissue and Paper Company. Additional field work is necessary to determine to what extent each of these facilities contributes to the pollution of these waters.

Mohawk River Basin

Mohawk River

In general, the Mohawk River can be categorically considered as being of poor water quality. High coliform and BOD counts, low dissolved oxygen levels, high turbidity and extensive sludge buildups

have been recorded throughout the river. At certain discharges near Rome high copper concentrations and color have also been noted. This condition extends as far downstream as Utica. The discharges from 11 raw collection systems and 15 primary and three secondary treatment plants contribute greatly to the degradation of these waters. The majority of these plants do not chlorinate. Also causing serious pollution problems are the discharge activities of 33 industrial firms. The majority of these firms are located in the Rome, Utica, Amsterda and Schenectady areas. Their operations generally cover wire, cable and machine manufacturing, food processing and paper and pulp production. It is important to note that three firms in Rome and one in Utica expel toxic metals into the Mohawk River. Additional study in this Region is necessary.

Oriskany Creek

Two industrial establishments and six municipal systems discharge wastes into Oriskany Creek. These discharges have created localized water quality problem areas characterized by low dissolved oxygen, high BOD and high coliform bacterial counts. A fish kill in 1962 was reported to have been caused by industrial wastewater discharge activities. Additional investigation is needed in this area to determine the extent both municipal and industrial waste discharges are contributing pollutional material to these waters.

Sauquoit Creek

Five municipalities and three industries are known to be discharging into Sauquoit Creek. These discharges have resulted in the gross pollution of these waters. Two of the municipal systems, Clayville and Whitesboro, provide no treatment and are considered the major sources of pollution in this area. Yorkville often by-passes its treatment facilities and expels raw unchlorinated discharges directly to the stream. Industrial wastes from Superfine Paper Mills, Clayville; Special Metals, New Hartford; and Utica Turbine Parts, Whitesboro have introduced toxic wastes, increased BOD and color. Fish kills have been traced to the industrial discharges in New Hartford. Other sources of pollution include the discharges of individual septic tank systems. Additional study in this area is required.

West Canada Creek

In general, the water quality of West Canada Creek is considered good. There are, however, localized pollutional problems of low oxygen and high bacterial counts downstream from the raw, unchlorinated discharges from several small municipal collection systems. The towns of Poland, Newport and Middleville have the largest of these. Industrial wastes from Consolidated Tanning Corporation at Middleville and Borden Foods at Newport may also be affecting these waters. Other factors that may be affecting water quality are low flow conditions, septic tank seepage and agricultural runoff. Additional study is required.

East Canada Creek

The East Canada Creek has a pollutional problem as indicated by high BOD, high coliform counts and sludge banking. Both municipal and industrial waste discharges combine to affect these waters. The most significant area of pollution is that stretch downstream from the primary treatment plant of the village of Dolgeville. Accumulated solids from this plant are periodically released to the creek, generally at times of high stream flow in the spring of the year. The Fowler Mohawk Corporation, a textile mill, also discharges its waste in the vicinity of Dolgeville. Many individual homes and summer cottages served by septic tank systems may be adding considerable amounts of organic material to East Canada Creek.

Cayadutta River

The Cayadutta River is severely polluted by the wastewater discharges of 17 known industrial establishments. Depressed dissolved oxygen, high BOD and high bacterial counts are particularly evident from Gloversville to the Mohawk. In this reach wastewater from ten industries, eight of which are leather tanning operations, is discharged into the river. Three other tanning plants, a textile plant and a food plant located in Johnstown further add to the degradation of these waters. The enormously overloaded secondary treatment facility at Gloversville, which doesn't provide chlorination, also contributes to water quality problems in this area. There are also numerous individual domestic septic tank systems that directly or indirectly enter the Cayadutta River.

Schoharie Creek

Available data indicate the pollution of Schoharie Creek. High BOD and coliform density counts have been recorded in the vicinity of the raw, unchlorinated discharge of the town of Middleburg. The primary treatment plant without chlorination facilities at Schoharie also affects the river at its discharge point. A meat packaging plant at Prattsville may contribute organic material to these waters. In addition, Cobleskill Creek may have an adverse effect on the quality of the waters of Schoharie Creek. There are no data available regarding present sewage disposal practices at Hunter, a large winter ski center and summer resort area. Additional investigation of this potential waste source must also be made.

Cobleskill Creek

There is evidence of pollution in Cobleskill Creek as shown by high coliform levels and high BOD. The primary treatment facilities at Richmondville and Cobleskill appear to be the major sources of pollutional material. Garbage and refuse are also suspected of entering the stream from the Cobleskill dump that is located adjacent to the stream. Their effect on the creek's water quality must be determined by further study.

Middle Hudson River Basin

Middle Hudson River

The Hudson River from Waterford to Peekskill can be categorically described as polluted. The discharges from 42 municipal collection and/or treatment facilities and 76 industrial establishments have caused high coliform density counts, high BOD and a corresponding reduced dissolved oxygen level. These conditions significantly interfere with the use of the river for water supply, recreation, and fish and wildlife. The levels of dissolved oxygen and coliform density observed by Project field work were such as to render the use of the Hudson unsuitable for recreation or water supply.

Existing data from FWPCA and State records indicate extremely poor water quality in the Albany-Troy-Rensselaer area. Here, the majority of municipal wastes are discharged raw and unchlorinated. Located in the Albany area are a number of paper manufacturing plants and meat packing houses. Both of these industrial groups contribute large organic loadings to the stream. Many tributary streams which receive either untreated or inadequately treated municipal and industrial wastewater discharges also contribute to the present condition of the Hudson River.

Patroons Creek

The lower portion of Patroons Creek, including the Russell Road Reservoir, can categorically be described as extremely polluted. The City of Albany has four outlets discharging directly into this stream, two of which discharge raw sewage.

Normans Kill

There are nine municipal systems which discharge wastes into the Kill. Additional survey work must be accomplished to accurately identify pollutional sources and determine the extent of pollution these sources have on the stream.

Coeymans Creek

Downstream from the Ravena sewage system discharge, Coeymans Creek can be described as extremely polluted. Floating solids and odors have frequently been noted. Three industries which discharge wastes into the stream may also be contributing to the degradation of these waters. Additional survey work must be accomplished before the effect on these wastes can be determined.

Stockport Creek and Tributaries

The raw discharges from numerous individual septic tanks have caused local water quality problems in the vicinity of Valatie town.

In addition, Stony Kill, a major tributary to the Creek which is being seriously polluted by the municipal discharges at Chatham and East Chatham as well as by septic tank seepage, may also be adversely affecting Kinderhook Creek. Additional study in this area is needed. Claverack Creek appears to be polluted by municipal and industrial wastewater discharges. Many private septic tank systems may also be contributing to the pollution load. Further survey work must be done to accurately identify pollutional sources and determine their effect on the stream.

Catskill Creek

The waters of the Catskill Creek are generally of good quality. There is, however, evidence of high temperature levels and coliform counts in the lower reaches of the creek near the village of Catskill. Three of the six municipal systems discharge raw unchlorinated wastewaters. The Cairo system which receives a large seasonal (summer) load and the Catskill collection system may be the largest contributors of bacterial wastes. These waters require further research, particularly with regard to thermal pollution.

Esopus Creek

Limited data indicate this creek is polluted by the discharge from five municipal sewage treatment plants. The wastes from one industries and limited natural flow also contribute to the creek's poor condition. Further data are needed to evaluate the full effect of these sources.

Rondout Creek

There is evidence that the waters of Rondout Creek are being polluted by the discharges of inadequately treated municipal and industrial wastewaters. Five industrial establishments and six municipal systems discharge directly into the Creek. The raw domestic wastes from the Kingston and Ellenville collection systems are the largest municipal systems on the Creek. Low flow conditions may also be contributing to poor water quality. In addition, the U. S. Public Health Service considered the presence of metals in the water the chief cause of a fish kill occurring at Ellenville in 1963. The existence of several metal working and finishing plants in the area suggests this condition may be amendable. More survey and analytical effort is needed.

Wallkill River and Tributaries

Waters of the Wallkill are characterized by low dissolved oxygen, high temperature, high pH and relatively high bacterial density counts. Eight industrial and 16 municipal systems are the major pollutional

offenders to these waters. One industrial wastewater discharge is suspected of containing toxic materials. Additional investigation is required.

Wappinger Creek

Limited data indicate that Wappinger Creek is not being seriously affected by the discharges of four municipal treatment facilities and two industrial firms. Additional investigation must be carried out to confirm this presumed water quality situation.

Moodna Creek

Observations made by Project personnel in August 1966 indicated that the waters of Moodna Creek were being adversely affected by both municipal and industrial waste discharges. Distinct odor, high color, scum and floating solids, sludge banks and oil residuals characterized water quality of the Creek from Salisbury Mills to the Hudson River. The New Windsor primary treatment facility, the Cornwall Paper Company, and Majestic Weave Corporation are considered to be the major sources of pollutional material. Other contributing factors are limited stream flow, septic tank seepage and the accumulated residual fiberous material expelled into the Creek by the defunct Park Paper Mills in Salisbury Mills.

STREAM CATEGORIZATION

To highlight the extent of existing information on present water quality of the various streams, rivers and lakes within the Region, a system of categorization was used to summarize existing data. This system assigns to each water body one or more of the following categories:

Category I	-	No water quality problems;
Category II	-	Water quality problems are known and solutions readily identified;
Category III	-	Water quality problems are indicated by available data, but causes and/or solutions are unknown;
Category IV	-	Insufficient data to indicate presence or absence of problems.

The categories assigned to the receiving waters as shown in Table VI-1, point out that little or no information is available as to the extent of pollution other than that from certain municipal and industrial waste discharges. Where available data indicate a need for increased treatment at existing plants, or for construction of new facilities, a Category II was assigned. In many cases, however, lack of information on other sources of pollution, or the seriousness of the problem, resulted in the additional assignment of Category III and/or IV.

Table VI-1 also indicates suspected sources and problems for the various streams. These data, which are based on limited analytical work, combined with knowledge of the particular water body, indicate a need for further studies to determine the extent and control of such pollutional problems as:

1. Pollution from recreational and commercial boating;
2. Stormwater overflows;
3. Septic tanks and cesspools;
4. Natural and man-caused eutrophication of lakes;
5. Thermal pollution;
6. Stream flow regulation; and
7. Agricultural drainage.

Since the categories have been assigned on the basis of present knowledge and conditions, continued surveillance should be undertaken to permit identification of new problems as they arise.

MUNICIPAL & INDUSTRIAL POLLUTION SOURCES

The data on which this section is based were obtained from the FWPCA Municipal Waste Inventory of 1962, Project records and inventories maintained by some of the States. It should be emphasized that due to a lack of complete information from these sources it was necessary to make assumptions for some of the municipal waste sources and for many of the industrial waste discharges. Based on these data, there are 256 municipal and institutional, five Federal and 206 industrial sources discharging wastes into the inter- and intrastate waters of the Hudson-Mohawk Region. Of these 467 sources, 395 provide less than adequate secondary treatment.

Table VI-2 summarizes the distribution of waste sources in the Hudson-Mohawk Region by state and type, and indicates the estimated population served for municipal, institutional and federal wastes and the population equivalent of industrial wastes calculated on a BOD basis.

There are 116 facilities listed in Table VI-2, handling the waste load of one-half of the total sewered population; and which discharge into interstate waters or directly affect the quality of interstate waters. One hundred and five of the plants are located in New York, serving the needs of approximately 560,000 persons. Eleven other plants; four each in Massachusetts and New Jersey and three in Vermont treat the wastes of 64,000 persons. There are a total of 206 industrial operations discharging wastes into all waters of the Region. These operations include paper and pulp production, tanning operations, textile production, food processing, heavy industry including automobile manufacture, ore and metal manufacture and processing, dairy products processing, brewing, and wire cable manufacturing. All but eight of the industries are located in New York State. The interstate

industrial waste load in the Hudson-Mohawk Region is nearly three times that of the entire interstate sewered population. Paper and pulp operations generate two-thirds of the total industrial waste load and textile mills an additional seventh.

The intrastate industrial waste load is only slightly larger than the municipal and institutional. The textile industry accounts for two-fifths of the intrastate BOD load and tannery operations contribute another quarter. These operations are also suspected of discharging toxic materials and pathogenic bacteria.

OTHER POLLUTION PROBLEMS

Recreational and Commercial Navigation

Both recreational and commercial navigation are important water uses throughout the Hudson-Mohawk Region. Recreational boating can constitute a significant source of pollution as a result of the discharge of human fecal matter, litter, motor exhaust and oil. The discharge of untreated human feces from the many boats in the Region represents a significant health hazard, which is particularly acute in crowded marinas where people virtually live aboard ships. The States of New York and New Jersey have regulations governing the disposal of wastewater from watercraft. The other States do not as yet have such regulations. Because of the lack of regulations and enforcement, treatment devices such as macerator-chlorinators, incinerator toilets, and holding tanks are not generally in use. In the case of holding tanks, there is a lack of adequate shoreside facilities to receive and treat the waste.

The rapid growth of pleasure boating has resulted in an appreciable increase in dumping of litter, including such materials as plastic food wrap, and glass, metal and cardboard containers. These materials do not readily disintegrate. Some may float onto the shoreline, resulting in the deterioration of the aesthetic quality of the environment.

The exhaust from outboard and certain inboard motors is discharged directly into the water, resulting in contamination of the water by hydrocarbon residues. In restricted waters, such as the numerous coves and inlets found along the shores of the many ponds and lakes of this region, the concentration of these chemicals could increase to levels detrimental to aquatic life.

Oil pollution can occur as the result of careless operation of recreational boats, but due to the volume of oil involved this phase of the problem is usually limited to those areas where large numbers of boats are concentrated, such as marinas. Of much greater significance is the problem of oil pollution by commercial navigation.

The discharge of oil by commercial traffic may be the result of bilge pumping or physical damage to a tanker or barge, as well as spillages which can occur during ship to shore transfer. At the present time, because of the shallow commercial waterway, this problem is confined to the various terminal facilities.

Septic Tanks and Cesspools

Within the Hudson-Mohawk Region, there are more than 1,000,000 persons occupying 285,000 housing units, as well as unknown numbers of business establishments, that dispose of domestic wastes by individual septic tanks or cesspools. These data do not include the number of people using septic tanks in Albany, Schenectady, Troy, Utica and Rome. When the overflow from septic tanks is discharged directly into surface waters, significant bacterial pollution results. Many miles of streams have been contaminated by such practices, restricting the use of the water for bathing and other recreational activities.

In non-porous soils, tile fields often fail to handle septic tank overflows in a satisfactory manner, resulting in the overflow of effluent in backyards, streets and finally as surface runoff. Percolation of septic tank effluent into shallow ground water aquifers, which eventually discharge into springs, streams or lakes, adds pollutional material to these surface waters. Under proper geological conditions, deep aquifers can also become polluted by wastes from inadequate domestic disposal systems. Such contamination can produce public health problems in those areas where the ground water is developed for individual and municipal water supplies.

In addition to bacteria there are other substances which are ineffectively treated by cesspools and septic tanks and which have been found entering sub-surface aquifers. Although specific information on ground water pollution by such material is not at present readily available for the Hudson-Mohawk Region, experience in other areas such as Long Island, New York, indicate that this problem can be extremely serious. To prevent such problems will require detailed investigations of the extent and location of individual waste disposal systems as well as the geology of the underlying soil.

Eutrophication and Aquatic Vegetation

There are certain waters in the Hudson-Mohawk Region that are sufficiently rich in both phosphorus and nitrogen to support prolific growths of aquatic weeds and algae. Such growths can interfere with pleasure boating, bathing and other recreational water use.

The major sources of nutrients are the discharges of raw and treated municipal wastes. Other sources, the significance of which are not known, include the overflow or percolation from individual

septic tank systems, direct discharges from recreational boating, and runoff from agricultural areas. The problem is complicated by restricted water movement and shallow water depths in many of the coves, lakes and canals in the area. There are very limited data available on the extent of this problem, the causes and control methods to be used to prevent further interference with water use.

Stormwater Runoff

Over 40 percent of the total sewered population in the Hudson-Mohawk Region are served by municipal sewerage systems that have, at least in part, combined stormwater - sanitary sewage collection. Utica and Amsterdam on the Mohawk and Troy, Cohoes, Kingston, Poughkeepsie and Newburgh on the Hudson are the major cities using these combined systems. During storm periods, the overflows from these systems can represent a significant source of pollution. In addition to the discharge of untreated mixtures of sanitary waste and stormwater, these overflows include large amounts of suspended solids, putrescible organic matter and bacteria which had previously settled to the bottom of sewers and are flushed out during the early stages of storms.

The extent to which stormwater overflows may be affecting the beneficial use of the waters in the Region is not known. Investigations are necessary to determine the quality and quantity of stormwater overflow, the effect such discharges have on the water quality of the receiving waters, and needed remedial measures with associated cost estimates.

Salt Intrusion

The entire length of the Hudson River from the Battery in New York City to the Federal Dam at Troy, a channel of 152 miles, comes under the influence of the ocean tides. Under average summer low flows the salt will generally intrude up to mile point 65 near Chelsea, but during the 1964 drought significant salt concentrations were measured about 84 miles up the River. The intrusion of ocean salt increases as fresh water flows decrease. There is also concern regarding the effect the proposed Consolidated Edison pumped storage installation at Cornwall might have on intrusion in the Hudson. The various diversions of Hudson River waters coupled with decreased fresh water flow can result in greater salt intrusion. More detailed studies are required.

Camping

Camping has become an extremely popular recreation activity in the Hudson-Mohawk Region. The Adirondack and Catskill mountain sections

are readily accessible and adaptable to recreational activities, many of which are water based. The Region affords many good locations for public and private camping sites. A number of the lakes and streams have State and private campsites on islands or along their banks. The Sacandaga Reservoir and Lake Piseco are two of the largest campsite areas. In 1965, there were over 50 major local, private and State campgrounds throughout the Region. While facilities vary at different sites, most are equipped with running water and sanitary facilities. Many of these sites provide opportunities for bathing, hunting and fishing to make possible optimum use of these facilities. The need for this type of recreational activity has been steadily increasing and considerable effort is being exerted by public and private interests to meet these needs.

There are little data available to indicate the degree wastes originating from campground sites are being treated and the extent to which such wastes may be affecting adjacent waters. Without adequate treatment, these waste discharges result in localized pollution problems and can restrict and even eliminate the use of this natural recreational resource. A survey should be made to determine the extent of this problem.

Thermal Pollution

There are at least five fossil fuel steam electric generating plants with a total capacity of 675,000 KW located in the Region. The Niagara Mohawk Power Corp. plant at Albany and the Central Hudson Gas and Electric Corp. facilities at Danskammer Point are the largest units in the Region. Many industrial firms withdraw large volumes of water for condensing or cooling purposes. After use these waters, which contain substantial amounts of heat, are returned to the water bodies from which they were withdrawn. Such heated discharges can have a detrimental effect on dissolved oxygen levels and fish and other aquatic life. The growing competitiveness of thermo-nuclear (constant run) power plants and the continuing increase in industrial cooling water usage demonstrate the need for a more comprehensive study of the effects of heated discharges on the Region's waters.

Dredging Operations

Extensive dredging activities carried out to maintain channel depths, develop new marinas, construct new or improved accesses to marinas, and other commercial enterprises can contribute to the degradation of water quality. Dredging often results in the re-suspension of accumulated organic sludges and silt. Uncontrolled dredging can alter flow patterns and create potholes in the River bottom. Disposal of dredged materials can also create serious pollutional problems, if such procedures do not include provisions for prevention of the return of spoiled material back to water and precautions to minimize

creation of public health hazards. Disposal operations can also destroy the usefulness of undeveloped lands such as channel islands, flats and river marshes as refuge areas for the wildlife and waterfowl.

Flow Regulation

New York's State Barge Canal System is punctuated by a number of navigation locks, which act as flow regulation devices and create a number of large impoundments with limited flow. The Erie Canal which forms a part of this system parallels and in many cases channelizes portions of the Mohawk River. The effect of this regulation and that of the various hydroelectric projects on water quality should be studied.

TABLE VI-1

STREAM CATEGORY DESIGNATION
INTER- AND INTRASTATE STREAMS

Name of Lake and/or Stream	Number of Pollution Sources		Category	Problem
	Municipal	Industrial		
	Upper-Hudson River Basin			
Upper Hudson River Basin Total	54	35		
Upper Hudson River	20	16	II	Mun.-Ind. Waste Disc. Effects of trib. waters
			III	Recreational boating, toxic materials and other unknown waste sources.
Schroon River	5	1	II	Mun.-Ind. Waste Disc.
			III	Septic tank seep.
Sacandaga River and Reservoir	3	0	II	Mun. Waste Disc.
			III	Ind. Waste Disc. Septic tank seep. rec. boating & camping waste.
Batten Kill	3	4	III	Mun.-Ind. Waste Disc.
Kayaderosseras Creek	2	2	III	Mun.-Ind. Waste Disc.
Hoosic River	8	8	II	Mun.-Ind. Waste Disc.
			III	Toxic material disc. Septic tank seepage. Low flow conditions.
Little Hoosic River (Trib.)	1	0	III	Septic tank seep. Low flow cond.
Wallomsac River (Trib.)	1	2	III	Mun.-Ind. Waste Disc.

TABLE VI-1

STREAM CATEGORY DESIGNATION
INTER- INTRASTATE STREAMS (Cont'd)

Name of Lake and/or Stream	Number of Pollution Sources		Category	Problem
	Municipal	Industrial		
Upper Hudson River Basin (Cont'd)				
Misc. Trib. and Lakes	11	2	III IV	Mun.-Ind. Waste Disc. Septic tanks, agricultural runoff, low flow conditions, and other waste sources.
Mohawk River Basin				
Mohawk River Basin Total	71	60		
Mohawk River & Erie Barge Canal	29	33	II III	Mun.-Ind. Waste disc. Toxic material disc.
Oriskany Creek	6	2	II	Mun.-Ind. Waste disc.
Sauquoit Creek	5	3	II III	Mun.-Ind. Waste disc. Septic tank seepage. Individual outlets.
West Canada Creek	7	2	III	Mun.-Ind. Waste disc. Septic tank seepage, agricultural runoff, low flow conditions.
East Canada Creek	4	1	II III	Mun.-Ind. Waste disc. Septic tank seepage.
Cayadutta Creek	1	17	II III	Mun.-Ind. Waste disc. Septic tank seepage.
Schoharie Creek	4	1	III	Mun.-Ind. Waste disc.
Cobleskill Creek (Trib.)	2	0	III	Mun.-Ind. Waste disc. Garbage, refuse disposal pract.

TABLE VI-1

STREAM CATEGORY DESIGNATION
INTER- INTRASTATE STREAMS (Cont'd)

Name of Lake and/or Stream	Number of Pollution Sources		Category	Problem
	Municipal	Industrial		
Mohawk River Basin (Cont'd)				
Misc. Trib. and Lakes	13	1	III IV	Mun.-Ind. Waste Disc. Septic tank seepage, agricultural runoff, camping waste disc. Low flow condition. Other unknown sources
Mid-Hudson River Basin				
Mid-Hudson River Basin Total	136	111		
Mid-Hudson River	42	76	II	Mun.-Ind. Waste Disc. Effects of trib.wastes
Petroons Creek	4	0	II	Mun. waste disc.
Normans Kill	9	0	II	Mun. waste disc.
Coeymans Creek	1	3	II	Mun.-Ind. waste disc.
Stockport Creek and Trib.	7	3	II III	Mun.-Ind. waste disc. Septic tanks.
Catskill Creek	6	3	III	Mun.-Ind. disc. and thermal pollution.
Esopus Creek and Trib.	5	1	II III	Mun. waste disc. Ind. waste disc. Septic tank seepage. Poor flow conditions.
Rondout Creek and Trib.	6	5	III	Mun.-Ind. disc. Low flow conditions and toxic metal disc.
Wallkill River and Trib.	16	8	II III	Mun.-Ind. disc. Toxic material. High temperature and pH.
Wappinger Creek	4	2	III	Mun.-Ind. disc.
Moodna Creek	5	3	II	Mun.-Ind. disc.

TABLE VI-1

STREAM CATEGORY DESIGNATION
INTER- INTRASTATE STREAMS (Cont'd)

Name of Lake and/or Stream	Number of Pollution Sources		Category	Problem
	Municipal	Industrial		
Moodna Creek (Cont'd)			III	Critical flow conditions, septic tank seepage and accumulated organic material.
Misc. Trib. and Lakes	31	7	III IV	Mun.-Ind. waste Disc. Septic tank seepage, agricultural runoff, camping waste disc. Low flow conditions, and other unknown sources.

TABLE VI-2

WASTE SOURCES IN
HUDSON-MOHAWK REGION
SUMMARY [a]

INTERSTATE WATERS

State	Municipal & Institutional		Federal		Industrial	
	No.	Population Served(000)	No.	Population Served(000)	No.	PE-BOD (000)
New York	104	555	1	5	112	1,538
Massachusetts	4	37	0	-	4	69
New Jersey	4	15	0	-	0	-
Vermont	3	12	0	-	4	41
	115	619	1	5	120	1,648

INTRASTATE WATERS

State[b]	Municipal & Institutional		Federal		Industrial	
	No.	Population Served(000)	No.	Population Served(000)	No.	PE-BOD (000)
New York	141	563	4	na	86	616
GRAND TOTALS	256	1,182 [c]	5	5 [c]	206	2,264 [d]

[a] Population served for municipal sources; Population equivalent for industrial determined on a BOD basis using an estimated daily per capita loading of 0.167 pounds of BOD.

[b] No industries discharged into intrastate waters in states other than New York.

[c] Total of known population served.

[d] Total of calculated population equivalents.

na = Data not available.

VII - DESCRIPTION OF THE REGION

LOCATION

The Hudson-Mohawk Region consists of two major drainage basins which are located chiefly in eastern New York State but also include small portions of Massachusetts, Vermont and New Jersey. The 270 mile long Hudson River, from its source in northern New York to the Bear Mountain Bridge at the southern boundaries of Orange and Putnam Counties, together with all its tributaries entering above the bridge except the Mohawk, drains some 9,100 square miles. The 155 mile long Mohawk River and all tributaries entering from its mouth on the Hudson River to the Regional boundary just west of Rome, New York drain some 3,500 square miles. The Mohawk River Basin lies entirely within New York State. The Wallkill River originating in New Jersey, the Hoosic River draining portions of Massachusetts and Vermont, and Batten Kill and the Walloomsac River originating in Vermont are the chief interstate tributaries of the Hudson River. The Mohawk River flows east southeast between the Adirondack and Catskill Mountains. The Hudson River flows generally south, bounded partly by the Taconic Mountains on the east.

GEOLOGY

Based on bedrock geology, the Region may be divided into six areas, which are: the eastern Adirondack Mountains, the Hudson River Valley, the Mohawk River Valley, the Catskill Mountains, the Wallkill River Valley, and the Taconic Mountains.

The eastern Adirondacks consist mostly of granite and syenite gneiss intruded with anorthosite and gabbro. Within the granite area are small irregular patches of pre-Cambrian sediments known as the Grenville formation. Much of this is shale and sandstone metamorphosed to schist, but some is crystalline limestone and easily erodible.

The Hudson River Valley consists principally of shale, limestone and sandstone. These are highly folded sedimentary rocks which strike north. Toward the east they occur as slates, schists, marbles and quartzites. The bedrock is overlain by a deposit of marly, bluegray, fine-grained, plastic clay extending continuously 160 miles northward from Haverstraw, New York. In the vicinity of West Point and Bear Mountain highly metamorphosed gneisses and igneous rocks are crossed by the Hudson River.

The Mohawk River Valley is located within an area of Hudson and Utica shales. North of the main stream the shales, limestones and sandstones surround outcrops of granites and gneisses of the Adirondack area. South of the Mohawk River, the Hudson and Utica shales are followed in ascending series by similar sandstones, shales and limestones.

The Catskill Mountains are composed of tremendous thicknesses of massive red and gray sandstones and shales of Devonian age which are underlain by Silurian shale, sandstone and limestone formations with low dips. The rocks dip more steeply and the Silurian strata are deformed near the Hudson River.

South of the Catskill Mountains is the Shawangunk Range consisting chiefly of soft Ordovician shales capped with harder Silurian conglomerate. At the extreme south end of the basin is found a series of pre-Cambrian gneisses overlain in part by Triassic sandstones and shales containing sheets of basalt and diabase, which outcrop along the westerly bank of the Hudson River to form the Palisades. The Wallkill River flows between these two prominent features.

The Taconic Mountains consist largely of Cambrian and Ordovician slates and schists underlain by limestone which is occasionally exposed in the valleys. The western foothills of the Taconic Mountains form part of the slate belt extending north as far as Vermont.

During the Pleistocene, the entire Hudson River Basin was covered by ice sheets, which left extensive deposits of glacial materials in the valleys of the Upper Hudson River Basin. The soil above Glens Falls consists almost entirely of Gloucester loam which had its origin in glacial till derived from crystalline rocks, while below Glens Falls the somewhat more productive soils derive from shales and sandstones.

The Mohawk River was at one time the outlet of a vast inland sea, which covered the northern portion of the United States when the St. Lawrence River was blocked by ice. The resulting wide flat flood plain varies in width from 500 to over 8,000 feet, and the flats adjoining the stream have a cover of rich alluvial soil. Beyond the flats, the hills rise several hundred feet above the stream level. The higher areas are covered with sandy and gravelly loam. In ancient times the Mohawk discharged into a lake near Albany forming a sand and clay delta from the Helderberg Mountains north to Glens Falls.

HYDROGRAPHY

Average annual precipitation varies from 34 inches in the center of the basin to more than 50 inches in the southern foothills of the Adirondacks. Most of the basin receives an average of about 40 inches. The precipitation distribution pattern reflects the influence of the mountain ranges on air movement through the basin. The precipitation is fairly evenly distributed throughout the year with only a slight rise during the summer. In the Hudson River Valley thunderstorms are common rain producers during the summer. In the upper Hudson and Mohawk River Basins most of the winter precipitation is in the form of snow. The average annual snowfall for the basin ranges from 40

inches in the lowlands at the southern end of the basin to over 130 inches in the Adirondack Mountains, where snow cover of at least an inch lasts an average of three to four months.

Average annual runoff ranges from ten inches in the upper Hudson River valley to 45 inches in the southern Green Mountains of Vermont. The average runoff for a 19-year period of record on the North Branch of the Hoosic River at North Adams, Massachusetts was 33 inches. The average annual evapo-transpiration water loss ranged from 19 inches in the Adirondack Mountains to 25 inches in the southern part of the subregion and averaged about 21 inches. The average annual evporation from water surfaces ranged from 23 inches in the northwest to 28 inches in the extreme southern part of the subregion and averaged about 25 inches.

Ground water in the Region is widely available but generally limited in quantity. It originates as precipitation that falls on the land and percolates to the ground-water reservoirs. These reservoirs are generally relatively shallow and are usually completely recharged every spring. The quality of ground water in the Region is generally harder and more highly mineralized than the surface waters but is generally suitable for domestic, industrial, and agricultural uses. The base flow of some rivers in the Region is maintained by the discharge from ground-water reservoirs.

The natural surface waters in the Region are soft, relatively low in suspended material and mineral content, and generally excellent for domestic, agricultural, and industrial uses. However, many of the rivers have been polluted by untreated sewage, industrial wastes and process water with resulting damage to recreation, fishing, and municipal, agricultural, and industrial water supplies.

The Hudson River Basin contains several large lakes, most of which are in the northern sections. The largest lakes are artificial and include Sacandaga Reservoir, Indian Lake Reservoir, Delta Reservoir, Hinckley Reservoir, Schoharie Reservoir and Ashokan Reservoir. The largest natural lakes are Saratoga and Schroon Lakes. Except for Lake Pleasant and Piseco Lake, the remaining lakes and ponds are small and generally located near the headwaters of streams.

The Hudson River is tidal from its mouth to the dam at Troy, where the semidiurnal rise and fall is almost five feet. The river is subject to salt intrusion for approximately 65 miles from its mouth. Somewhat further north in the Poughkeepsie Area the water receives extensive treatment for drinking purposes.

SOCIO-ECONOMIC CHARACTERISTICS

Population in the Hudson-Mohawk Region was 1,707,504 in 1960, the year of the last U. S. Census. It is presently estimated that population will advance 63 percent during the 1960-1990 period to 2,780,000. Elaborate, well-planned water supply and wastewater control programs must be developed and administered throughout the

Hudson-Mohawk Region or its water resources will be degraded and the growth indicated may never materialize.

The distribution of the population by county in the Hudson-Mohawk Region for the period under discussion is outlined in Table VII-1.

In 1960, 1,629,447 or 95.4 percent of the total Hudson-Mohawk population were New Yorkers. The balance of the Region's population consisted of 33,252 Massachusetts residents, 22,789 Vermont residents, and 22,016 New Jersey residents.

Based upon 1960 population figures the Upper Hudson subbasin had 217,200 persons or 13 percent of the total population in the Hudson-Mohawk Region, the Middle Hudson 926,700 or 54 percent, and the Mohawk 563,600 or 33 percent. It is presently estimated that during the period 1960-1990 the population of the Upper Hudson subbasin will advance 45 percent to 314,000, the Middle Hudson 87 percent to 1,736,000, and the Mohawk 30 percent to 730,000. The population densities during this same period will advance from 48 to 70 persons per square mile in the Upper Hudson subbasin, 201 to 376 in the Middle Hudson, and 158 to 205 in the Mohawk.

The Hudson-Mohawk Region may also be divided into three economic subregions for an analysis of employment patterns (wage and salary employment covered by social security).

The Capital District subregion (Albany, Schenectady, Rensselaer and Saratoga Counties), which accounts for somewhat more than two-fifths of the Region's employed, is fortunate to have a diversified balance of economic activity. Though manufacturing provides employment for the largest proportion of workers in this Region, trade (retail and wholesale), services and government activities are also well represented. Albany, the state capital and largest city, is recognized as the major government, trade and distribution center of the subregion. Schenectady, the second largest city, is world famous for its production of electrical equipment and locomotives. Troy, another important urban center in the Region, is known for apparel, apparel finishing, and primary metal and metal finishing operations. Running through the center of the Capital District region are the two largest rivers in the Hudson-Champlain Project, the Hudson and Mohawk--each of which receive the wastes from numerous industrial and municipal outfalls in this vicinity.

The Mohawk Valley region (Oneida and Herkimer Counties) has 15 percent of the total employed. The development of this region can be attributed to its strategic location on the Mohawk River, a natural trade corridor traversing central New York from west to east. This subregion is one of the most highly industrialized in the State. Firms producing machinery, metals, electronics, ordnance and other heavy goods industries have helped stabilize the region's economy, which

previously was overly dependent on non-durable-goods (apparel, textiles, and leather). In and around the cities of Utica-Rome, where most of the industrial, commercial and cultural life of the region is centered, dozens of wastewater outfalls empty into the Mohawk.

A quarter of the Region's employed work in the Mid-Hudson subregion (Orange, Dutchess and Ulster counties). Five of today's six largest cities were originally built on the banks of the Hudson to benefit from its transportation advantages. Now each of these cities depends upon other economic factors for its livelihood. The subregion has an expanding and well diversified economy based on manufacturing (IBM, du Pont and cement), agriculture (black angus cattle, Delicious apples and rock cornish hens) and the resort industry (Grossinger's and the Concord). The subregion, probably because of its favorable position between two large centers of population and industry (New York City on the south and the Capital District region on the north), has also attracted numerous research and development organizations which in turn have stimulated growth.

An analysis of the employment patterns (wage and salary workers) in the Hudson-Mohawk Region in 1964 shows that 176,000 or 43 percent of the total 408,000 covered workers were in manufacturing positions. Persons engaged in a wide range of services activities (bellboys, bankers and bus drivers) comprised the second largest employment category, numbering almost 115,000. Trade (both wholesale and retail) provided the third largest source of employment, 99,000 jobs for workers in the Region.

Federal employment sources indicate that it would be reasonable to increase the total covered employment figure by 20 percent, or about 82,000, to account for all local, State and Federal government workers. Add to this total all farm workers, self-employed and others, and the aggregate total employment in the Region would be more than half a million. Using the aggregate employment figure as a basis for analysis points up the favorable diversification of economic activity that exists in the Region. Total employed labor force in the Hudson-Mohawk Region is distributed among the major economic sections as follows: manufacturing, 35 percent; service activities, 23 percent; trade, 20 percent; government, 17 percent; all other activities, 4 percent.

Manufacturing in the Region is dispersed among all major industries usually found in this part of the Nation. Four major industries however, account for large concentrations of total factory employment in the Region. These four are machinery, except electrical, 27 percent; chemicals, 10 percent; textiles, 10 percent; and food, 10 percent.

TABLE VII-1

DISTRIBUTION AND PROJECTION OF POPULATION
IN THE HUDSON-MOHAWK REGION BY REGION
AND COUNTY, 1960 AND 1990

Region and County	Total County Population 1960	HCMC Project % Population 1960	Hudson-Mohawk Region % Population 1960 2/	Population 1960	Population 1990
HUDSON-MOHAWK REGION TOTAL		8.8 1/		1,707,504	2,780,000
New York State					
Albany	272,926	100.0	100.0	272,926	433,000
Columbia	47,322	100.0	97.9	46,328	57,000
Delaware	43,540	0.5	100.0	217	200
Dutchess	176,008	100.0	91.7	161,399	387,000
Essex	35,300	99.8	9.4	3,318	4,000
Fulton	51,304	100.0	100.0	51,304	52,000
Greene	31,372	99.4	100.0	31,184	38,000
Hamilton	4,267	68.9	100.0	2,939	3,000
Herkimer	66,370	92.6	100.0	61,458	73,000
Lewis	23,249	0.8	100.0	185	200
Madison	54,635	2.0	100.0	1,087	2,000
Montgomery	57,240	100.0	100.0	57,240	53,000
Oneida	264,401	77.1	100.0	203,853	314,000
Orange	183,734	92.0	86.7	146,619	399,000
Otsego	51,942	0.6	100.0	311	400
Putnam	31,722	100.0	6.6	2,093	8,000
Rensselaer	142,585	100.0	100.0	142,585	170,000
Saratoga	89,096	100.0	100.0	89,096	150,000
Schnectady	152,896	100.0	100.0	152,896	189,000
Schoharie	22,616	96.3	100.0	21,779	20,000
Sullivan	45,272	14.6	100.0	6,609	8,000
Ulster	118,804	99.7	100.0	118,447	203,000
Warren	44,002	100.0	86.6	38,123	54,000
Washington	48,476	100.0	34.0	17,451	18,000
New York State Total	2,059,079			1,629,447	2,635,800
Vermont					
Bennington	25,088	94.3	96.3	22,789	34,000
Massachusetts					
Berkshire	142,135	97.9	23.9	33,252	48,000

TABLE VII-1

DISTRIBUTION AND PROJECTION OF POPULATION
IN THE HUDSON-MOHAWK REGION BY REGION
AND COUNTY, 1960 AND 1990 (Cont'd)

Region and County	Total County Population 1960	HCMC Project % Population 1960	Hudson-Mohawk Region % Population 1960 2/	Population 1960	Population 1990
New Jersey					
Sussex	49,255	47.3	94.5	22,016	63,000

1/ Total 1960 HCMC Project Population - 19,292,000.

2/ Refers only to the Hudson-Mohawk portion within HCMC Project.

Sources: U. S. Bureau of the Census, 1960; Projective Economic Studies of New England, Arthur D. Little, Inc. Cambridge, Mass. 1964-1965; Demographic Projections, New York State Office of Planning Coordination; New Jersey Department of Conservation and Economic Development, Sept. 1966.

VIII - WATER USE

WATER SUPPLY

Present Demands

The following information on present water supply systems in the Hudson-Mohawk Region, serving more than 1,000 persons each, is based on the 1963 FWPCA Municipal Water Facilities Inventory and on State and other data, and is summarized in Table VIII-1.

Within the Region, there are 123 known municipal water supply systems which serve approximately 1,300,000 persons, with an average daily consumption of 218 MGD or 166 gallons per capita. Of these systems, 73 serving 932,000 persons (72 percent of the total) with 165 MGD rely solely on surface sources. Twenty-five systems serving 208,000 persons utilize only ground water sources, and 25 systems serving 170,000 persons use a combination of both surface and ground water sources.

Two stretches of the "mid" Hudson River are presently used for potable water supply. The longest section runs from Chelsea (Dutchess County) on the south to a point several miles north of Kingston (Ulster County). The three communities dependent upon the Hudson for drinking water in this stretch, are: Poughkeepsie, serving a population of 60,000, Highlands, with 4,500, and Port Ewen, with 2,600. During the recent drought emergency, the city of New York obtained 100 MGD of its drinking water from the Hudson at Chelsea. This stretch of the river is polluted by the direct wastewater discharge of 19 municipal systems, of which six serving 32,000 persons provide no treatment whatsoever, and 13 systems serving 63,000 provide only primary treatment. Thirteen of these 19 systems do not even disinfect their discharge. In addition, at least 16 industries discharge organic and color producing wastes in this stretch. Two expel toxic substances as well. A recent water quality sample taken of the Hudson at Poughkeepsie showed coliform counts of 1000/100 ml. The immediate control needs section of this report has outlined the appropriate actions required to abate pollution from each of the above waste sources.

The City of Rensselaer (population 10,506) has also found it necessary to use the Hudson as a potable water supply. The section of the river Rensselaer has had to draw from is contaminated by the wastewater discharge of almost 500,000 persons and 28 industries, several of which expel toxic and color materials. Fortunately, this situation will be corrected before the end of the year when a new water supply distribution system will be completely installed to serve the City of Rensselaer with the high quality waters of the Tomhannock Reservoir.

In the near future other communities are expected to draw water for potable use from the Hudson. The proposed Dutchess County Water District, the village of Rhinebeck, and Ulster County are possible users.

Because industry in the Hudson-Mohawk Region provides most of its own cooling and processing water from surface water resources, very little inventory data are available. Accordingly, current and future estimates for industrial consumption were based upon the known and projected employment by various water using industries in the region and the average water use by these industries for the northeastern region. The present total industrial water use is estimated to be 550 MGD. Approximately 450 MGD are furnished by industrial self-supply systems and the remaining 100 MGD is being supplied by municipal systems. Approximately 250 MGD of the total is used in process operations and the remaining 300 MGD for cooling, boiler feed and other operations.

An estimated 207,000 rural, domestic and agricultural housing units utilize individual wells and other private water supply sources. These systems supply an estimated 31 MGD of domestic and agricultural water to approximately 300,000 persons. Ground water aquifers are the primary source of these supplies.

The amount of water being used in the area for irrigation purposes is not considered significant.

Future Requirements

The following estimates of future water supply needs in the Hudson-Mohawk Region are based upon population projections as outlined in Section VII of the Report, the present per capita water consumption, and trends in the per capita water consumption for the Region as reported by the Senate Select Committee on Water Resources.

Average daily water consumption in the Region in 1966 is estimated as 165 gallons per capita. It is projected that by the year 1990 this usage will have increased to approximately 240 gallons per day, 76 percent of which is attributed to domestic, commercial and other public use with the remaining 24 percent allocated to industrial use. This distribution of the projected 1990 per capita water use can vary markedly depending upon the dynamics of growth and demand registered by industry and all other users. Technological advances in home appliances, and changing recreational uses and commercial demands may accelerate the projected upward trend towards more liberal water use patterns.

It is estimated that by 1990 the municipal water needs in the Hudson-Mohawk Region will amount to 670 MGD, with 510 MGD for domestic, commercial and other public use and the balance for industrial requirements. This increased consumption represents a gain of almost 300 percent above current water usage.

Future water demands in the industrial category can not readily be predicted at this time. Based on water discharge data compiled by the U. S. Bureau of Census projected to 1990 for the major water using industries in the region an estimate of total water use was made. Self-supplied industrial needs are therefore estimated to increase from 450 MGD to 520 MGD in the period 1960 to 1990.

Future needs (1990) can be met by the continued preservation and enhancement of the area's surface water and to a lesser extent by the greater development of ground supplies, coupled with proper planning and distribution to offset local shortages. A large surplus of water is available in the Hudson-Mohawk Region to meet future needs.

RECREATION

The waters of the Hudson-Mohawk Region are used intensively for such recreational uses as bathing, boating, and sportfishing.

Bathing

The entire Hudson-Mohawk Region affords a wide variety of beach and bathing opportunities. The upper Hudson, which includes the Adirondacks, contains numerous privately owned or rented summer camps that border the many lakes and serene reaches of the Hudson and Mohawk Rivers. The artificially impounded Sacandaga Reservoir is one of the most outstanding recreational resources for bathing and boating in the region with over 3,500 cottages and summer homes located along its 125 miles of shoreline. Other lakes which provide popular vacation facilities are Saratoga Lake, Schroon Lake, Piseco Lake and Indian Lake. Some swimming is done in the Mohawk, but the major portion takes place in the tributary and lake waters. Some municipal beach and bathing facilities are also located along the shores of the Hudson.

Recreational Boating

Recreational boating is widespread throughout the Region. Sacandaga Reservoir, Schroon Lake and Saratoga Lake are extensively used for pleasure boating. Another major attraction for the boating enthusiast is the inland navigable waterway which interconnects the Hudson River, Lake Champlain, the St. Lawrence River and the Great Lakes. Many cabin cruisers with home ports in Albany, New York Harbor, New Jersey, Long Island, Connecticut, the Great Lakes and Canada visit the Region during the boating season. The many marinas and yacht clubs located along the main stem Hudson are indicative of the extensive use of these waters for pleasure boating. Of the 87 private marinas and yacht clubs located along the Hudson River from Ellis Island to Troy, 51 are located in the mid-Hudson Region.

In 1966, more than 500,000 boats were registered in the State of New York, 350,000 of which were power driven. Only 60,000 vessels have toilets. The State of New York estimates that by 1980 the number of pleasure boats will nearly triple. Boating in the other states included in the Hudson-Mohawk Region is expected to increase at similar rates. The development of marinas and associated facilities to meet present and future recreational boating needs will result in greater pollution unless closer regulatory and surveillance activity is provided.

Sport Fishing

The Hudson-Mohawk Region presents a wide variety of fish and fishing opportunities. Fish are plentiful in both warm water and trout fishing

habitats. Salmon can be caught in Schroon Lake and Lake Luzerne. The bulk of the fishing is done by tourists and vacationers. Good trout fishing and warm water fishing is found on many tributaries of the Hudson and the Mohawk Rivers. Fishing on the Mohawk River, however, has decreased significantly because of pollution and canalization of the river, and fishing on the Hudson River below Glens Falls has been severly limited by the industrial complexes at Glens Falls, Hudson Falls and Fort Edward.

Waterfowl

The Hudson-Mohawk Region affords moderately abundant waterfowl hunting, attracting resident and non-resident recreation seekers which stimulates local business activities. The major habitat of waterfowl in the Region is in the Hudson-Mohawk Corridor, defined as the Hudson River from the Verrazano Narrows Bridge to the Adirondack Park boundary near Corinth and the Mohawk River from its mouth to Rome, including adjacent lands within one mile of the river except for Adirondack and Catskill Parks. Many of the marshes, bogs and natural small lakes found along the corridor provide good hunting. Pollution of marsh lands, however, has resulted in the depletion of waterfowl and has restricted the development of this natural recreational activity.

COMMERCIAL FISHING

Historically, the Hudson River had been an important commercial fishery, but data from the New York State Conservation Department shows a definite downward trend in the commercial fishing harvest. This decline is pointed up by a 50 percent decline in the shad catch and a 65 percent reduction in the striped bass harvest in recent years. Commercial fishing in the Hudson River is at a low point because of the reluctance on the part of fishermen to take fish from areas polluted by raw or inadequately treated sewage.

COMMERCIAL BOAT TRAFFIC

About 150 miles of the New York State Barge Canal System is in the Hudson-Mohawk Region. The New York State Barge Canal System consists of four major interconnecting canals (Erie, Champlain, Oswego and Cayuga-Seneca) which traverse the Erie-Niagara, Genessee, Oswego, Mohawk and Hudson River Basins. Oil pollution could be a serious problem in the canal system since such a large portion of the cargo is petroleum products, and since there is only one bilge discharge facility for the entire waterway above Troy.

TABLE VIII-1

MUNICIPAL WATER FACILITIES
SERVING 1,000 PERSONS OR MORE,
HUDSON-MOHAWK REGION
SUMMARY

State & Source	Facilities Number	Est. Pop. Served	Consumption (MGD)
Surface			
New York	63	846,000	151.2
Other a/	10	86,000	14.1
	73	932,000	165.3
Wells			
New York	22	194,000	27.6
Other a/	3	9,000	.7
	25	203,000	28.3
Both			
New York	21	134,000	17.9
Other a/	4	46,000	6.2
	25	170,000	24.1
GRAND TOTALS	123	1,410,000	217.7

a/ Massachusetts, New Jersey and Vermont.

APPENDIX A

CRITERIA FOR PRIORITY DETERMINATION

A system of priority ranking was developed for municipal and industrial construction needs, based on a series of criteria which indicate the urgency of abatement for each waste source. These criteria, which are in the form of a weighted scoring system, were applied to each known waste source. All sources were then ranked on the basis of final score, and divided into four priority groups, on the basis of engineering and economic judgment.

The criteria used to evaluate and rank the municipal treatment needs are presented in Table A-1. The scoring system includes such factors as existing treatment type, BOD loading discharged, size and use of the receiving stream, and previous enforcement activity.

A separate set of criteria which recognize the variation in industrial waste characteristics, were developed to rank industrial needs by priority. These criteria, shown in Table A-2, include such factors as waste toxicity, solids and color in addition to the factors used for municipal waste.

TABLE A-1

PRIORITY CRITERIA - MUNICIPAL WASTES

Aggregate Weight Adjusting Factors

		Percent
I	Type of Treatment.	35
II	Population Equivalents (P.E.)-Discharged (BOD) . . .	25
III	Receiving Water Use and Dilution	35
IV	Prior Orders Issued.	5

Enumerated Categories by Weight

I.A Type of Treatment

Bases	Wt.
No Treatment	100
Primary - No Chlorine - Overloaded	90
Primary - Chlorine - Overloaded	80
Primary - No Chlorine - Within design	70
Primary - Chlorine - Within design	60
Intermediate - No Chlorine - Overloaded	80
Intermediate - Chlorine - Overloaded	70
Intermediate - No Chlorine - Within design	50
Intermediate - Chlorine - Within design	40
Secondary - No Chlorine - Overloaded	70
Secondary - Chlorine - Overloaded	60
Secondary - No Chlorine - Within design	30
Secondary - Chlorine - Within design	0

II.A P. E. Discharged

BOD Range	
0 - 100	5
100 - 1000	10
1000 - 10,000	25
10,000 - 100,000	50
Over 100,000	100

III.A Receiving Water Use and Dilution

A Use

Drinking Water	80
Shell Fishing and/or Recreation	38
Sport Fishing	25
Other Uses	10

B Dilution

Large	0
Medium	15
Small	50

TABLE A-1 (CONT'D.)

IV.A	Prior Orders Issued	Wt.
	Yes	100
	No	0

TABLE A-2

PRIORITY CRITERIA - INDUSTRIAL WASTES

Aggregate Weight Adjusting Factors

		Percent
I	Effluent Waste Characteristics.	30*
II	Volume of Wastes.	30
III	Receiving Water Use and Dilution.	40

Enumerated Categories by Weight

I	Effluent Waste Characteristics*	Percent of Wt.
A.	Bacteria	
	less than 1×10^5 total coliform/100 ml	5
	between 1×10^5 to 1×10^6 total coliform/100 ml	20
	greater than 1×10^6 total coliform 100 ml	30
B.	BOD	
	less than 20 mg/l	0
	20 - 100 mg/l	5
	100 - 300 mg/l	10
	300 - 600 mg/l	15
	greater than 600 mg/l	20
C.	Color and/or foam	
	if significant in stream	5
D.	Floating Solids - oil, grease	
	if significant in stream	10
E.	pH	
	less than 5 or greater than 10	5
F.	Temperature rise	
	greater than $5^{\circ}F$ in stream	10

TABLE A-2 (CONT'D.)

G. Total Suspended Solids	
less than 75 mg/l	0
75 - 200 mg/l	10
greater than 200 mg/l	20
H. Toxic Chemicals	
toxic to fish in stream	50

*It can be noted that on the basis of the percent of weight, that the total weight of 30 can be exceeded. This is necessary in order to develop the proper priority when considering highly significant waste characteristics.

II A. Volume of Wastes	Percent of Wt.
Item	
1,000 - 10,000 gal. per day	10
10,000 - 100,000 gal. per day	20
100,000 - 1,000,000 gal. per day	50
1,000,000 - 5,000,000 gal. per day	100
greater than 5,000,000 gal. per day	150

III Receiving Water Use & Dilution	Percent of Wt.
A. Use	
Drinking Water	80
Shell Fishing and/or Recreation	38
Sport Fishing	25
Other	10
B. Dilution	
Large	0
Medium	15
Small	50

APPENDIX B

CONSTRUCTION ACTIVITY CODING

Two basic assumptions were used throughout in determining construction needs. Minimum acceptable treatment was defined as secondary treatment for municipal waste or its equivalent for industrial waste. All existing treatment plants constructed more than 20 years ago were considered obsolete and in need of complete replacement.

A system of construction coding was formulated to indicate the kind and amount of construction activity required to abate each municipal and industrial waste discharge. Each source was coded by an activity as shown in Tables B-1 (Municipal) or B-2 (Industrial).

TABLE B-1

MUNICIPAL CONSTRUCTION ACTIVITY CODES

Type of Facility	Status of Waste Source	Code Number
No Plant	Discharging raw sewage-build primary and secondary plant	01
Primary Plant	Not suitable for upgrading to secondary, build a new secondary plant	02
	Suitable for upgrading to secondary, if overloaded build secondary for overload	04
Intermediate Plant	Not suitable for upgrading to secondary, build a new secondary plant	03
	Suitable for upgrading to secondary, if overloaded build secondary for overload	05
Secondary Plant	Condition Good - if overloaded build secondary for overload only	06
	Condition Fair to Poor - if not overloaded continue to use	07
	Condition Fair to Poor - If overloaded build new secondary for total load	08
Any Plant or No Plant	Do not build or reconstruct, plant to be shut down and load picked up by another plant (load has been added to other unit)	09
	Replace septic tanks with new plant and collection system	10

TABLE B-2

INDUSTRIAL CONSTRUCTION ACTIVITY CODES

Code Number	Type of Activity
A	Provide secondary treatment or equivalent, including chlorination
B	Provide secondary treatment or equivalent
C	Provide for segregation and separate treatment of one or more types of waste that may include suspended solids, toxic matter, oil and/or grease, color and high or low pH
D	Same as C; plus biological treatment for all or part of the wastes, including chlorination

APPENDIX C

COST ESTIMATING PROCEDURES

Estimated costs of needed municipal construction activities were developed, using as a basis an unpublished study of sewage treatment needs in the Hudson River basin above Chelsea, New York.[1/] This study presented a sliding scale of unit cost by population served and by type of construction required.

In developing cost estimates, it was recognized that waste treatment facilities constructed in the immediate future should be designed for anticipated population growth through 1990, to allow for a plant life of 20 years. However, since no data are available to provide reasonable projections of sewered population on an individual plant basis, estimates were prepared for the region as a whole and then adjusted to reflect the needed additional capacity.

A basic cost was calculated for each municipal plant, using the present population served, the needed construction activity and the unit cost data. The results were summed for each priority and construction activity code and corrected by the FWPCA construction cost index projected to 1970. A 20 percent factor was then added to cover engineering, legal and other services, after which the cost estimates were revised to reflect the anticipated regional growth through 1990. Cost estimates for ancillary works, such as interceptor sewers, pumping stations and force mains were calculated as 83 percent of the treatment plant cost, based on the Study referred to above.

Industrial cost estimates were prepared by assuming equivalency between the costs of industrial and municipal plants to treat the same magnitude of organic loadings, expressed in terms of population equivalents, with the results projected to 1990 on the basis of anticipated growth of industrial water use. Ancillary works, such as process changes and segregation of wastes, were estimated as 50 percent of the treatment plant cost.

1/ Basic Data Branch, DWSPC, Public Health Service (now Division of Pollution Surveillance, Technical Programs, FWPCA) August 10, 1965, Subject "Sewage Treatment Needs in Hudson River Basin above Chelsea"

APPENDIX D

CONCLUSIONS AND RECOMMENDATIONS OF CONFERENCE IN THE MATTER OF POLLUTION OF THE HUDSON RIVER AND ITS TRIBUTARIES - NEW YORK AND NEW JERSEY, SEPTEMBER 28, 29, 30, 1965

1. The Hudson River and its tributaries, considered by this conference, are interstate waters within the meaning of the Federal Water Pollution Control Act.

2. There is interstate pollution of these waters. This pollution is subject to abatement under the Federal Water Pollution Control Act.

3. Such pollution is caused by many factors including sewage and industrial waste discharges, oil, silt, sediment, heat, floating solids, nutrients, sludge deposits, and combined sewer overflows. Sources of pollution are in both New Jersey and New York.

4. This pollution interferes with recreation, commercial fishing, sport fishing, navigation, domestic and industrial water supplies, and esthetic values.

5. The States of New Jersey and New York and the Interstate Sanitation Commission are empowered to abate pollution and have active programs to accomplish this result. These programs include: establishment of water quality requirements; enforcement actions to abate waste discharges; development of comprehensive water pollution control programs; and fiscal incentives.

6. Delays in abating pollution are caused by the lack of adequate treatment facilities and the complex technical and financial problems presented by the use of a waterway serving the largest metropolitan area in the country.

7. Cognizance is taken of the activities of the U. S. Army Corps of Engineers and the Coast Guard in abating pollution resulting from oil, sludge, silt and floating debris, as well as the program of the Federal Government to abate pollution from all Federal installations.

The Federal Water Pollution Control Administration shall advise and consult with other Federal agencies in the area covered by the conference to see that all Federal installations install, construct and operate adequate pollution control facilities which will meet the requirements of the States and Interstate Sanitation agency concerned, as well as the Federal Government.

The States and Interstate Agency recognize that the Federal Water Pollution Control Administration is the Federal agency primarily charged with the abatement of pollution of interstate or navigable waters. They recommend that the Administration take the lead in coordinating the activities of all Federal agencies concerned with water quality in the Hudson River and its tributaries so that the Federal Government may have a unified approach in dealing with the States and Interstate agency.

8. The benefits which would result from increased State water pollution control activities under such programs as the proposed $1 billion "Pure Water" Bond Issue in New York State are acknowledged.

9. All discharge sources to the Hudson River and its tributaries, whether public, Federal installations, or industrial, shall receive a minimum of secondary treatment or its equivalent, and effective disinfection of the effluents as required to protect water uses.

10. Industrial plants shall improve practices for the segregation and treatment of wastes to effect the maximum reduction of the following:

a) Acids and alkalis;
b) Oil and tarry substances;
c) Phenolic compounds and organic compounds that contribute to taste and odor problems;
d) Nutrient materials including ammonia and nitrogenous phosphoric compounds;
e) Suspended material;
f) Toxic and highly colored wastes;
g) Oxygen requiring substances;
h) Heat;
i) Foam producing discharges;
j) Other wastes which detract from recreation uses, esthetic enjoyment or other beneficial uses of the waters.

11. Surveillance and monitoring of the operation and maintenance of sewage and waste treatment facilities in the conference area shall be conducted by the States of New Jersey, New York, the Interstate Sanitation Commission, and the Federal Water Pollution Control Administration at locations and frequencies to yield reliable values of waste outputs and resulting receiving water quality, and to show their variations.

12. The Federal conferee recommends the following time schedule for the foregoing remedial program:

a) Designs for remedial facilities completed by January 1, 1967;
b) Financing arrangements completed by April 1, 1967;
c) Construction started by July 1, 1967;
d) Construction completed and plants placed into operation by January 1, 1970;

e) Commensurate schedules should be adopted for the interception and treatment of industrial wastes and wastes from Federal installations;
f) Existing schedules calling for earlier completion dates are to be met.

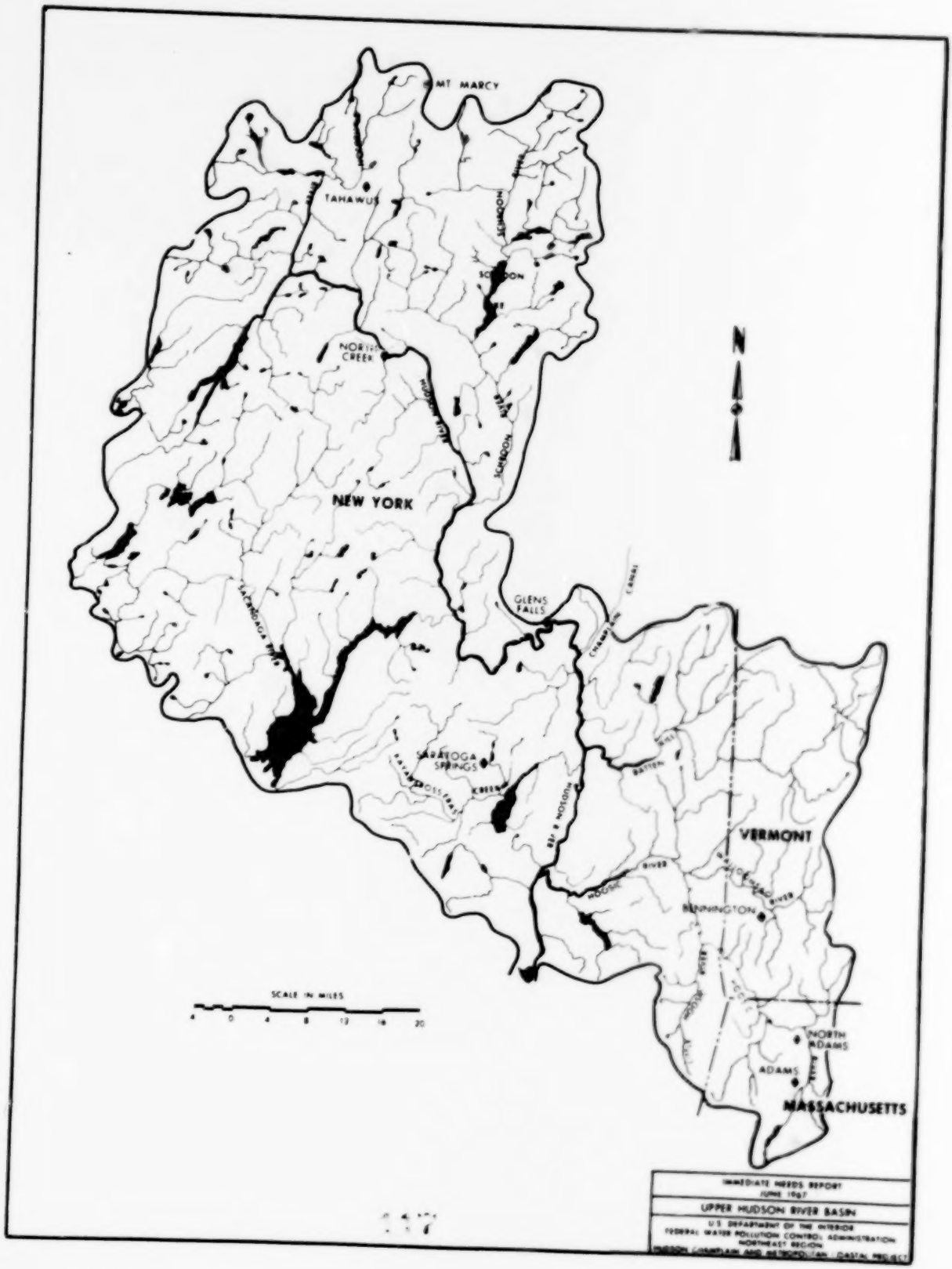
13. The magnitude of the pollution problem caused by discharges from combined sewer overflows is recognized. The Federal Water Pollution Control Administration, in cooperation with the States of New Jersey, New York, and the Interstate Sanitation Commission, will undertake a review of the problem and develop a program for action for consideration by the Federal Government, the States and the Interstate Sanitation Commission by December 31, 1968.

The construction of combined sewer systems in newly developed or redeveloped urban areas shall be prohibited, and existing combined sewers shall be eliminated wherever feasible.

Programs shall be established for surveillance of existing combined sewer systems and flow regulating structures to convey the maximum practicable amount of combined flows to an through treatment plants.

14. The conferees representing New Jersey, New York and the Interstate Sanitation Commission call attention to the fact that financing is the key to sewage treatment plant construction. In the past, the financial burden for construction of sewage treatment facilities has been borne by municipalities and industry. This method of financing must be changed if the progress visualized in this conference is to be achieved.

15. Regional planning is often the most logical and economical approach towards meeting water pollution problems. The water pollution control agencies of New Jersey, New York, and the Interstate Sanitation Commission, and the Federal Water Pollution Control Adminstration will encourage such regional planning activities.


MT MARCY
TAHAWUS
NORTH CREEK
NEW YORK
GLENS FALLS
SARATOGA SPRINGS
VERMONT
BENNINGTON
NORTH ADAMS
ADAMS
MASSACHUSETTS
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SCALE IN MILES
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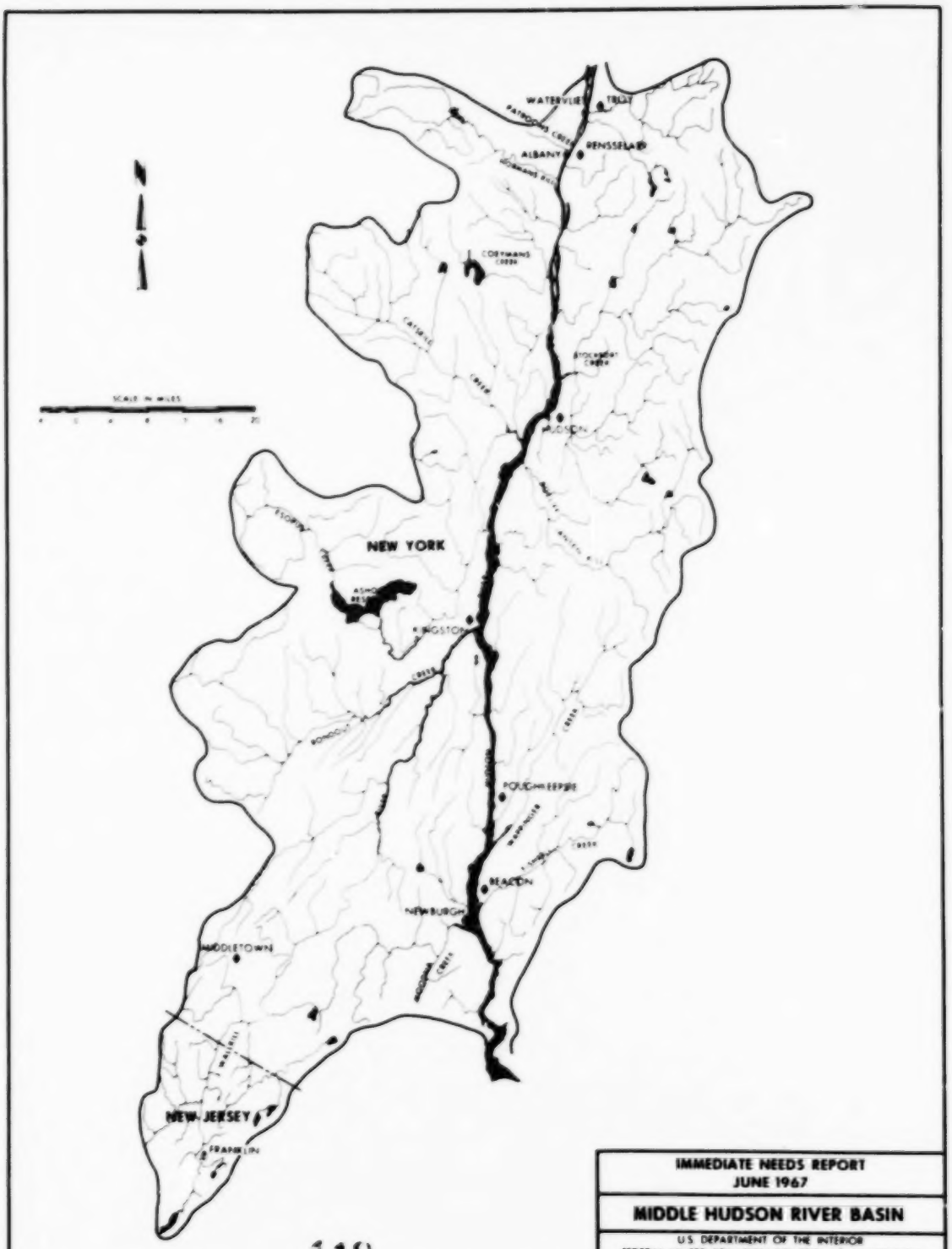
IMMEDIATE NEEDS REPORT
JUNE 1967
UPPER HUDSON RIVER BASIN
U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
NORTHEAST REGION

IMMEDIATE NEEDS REPORT
JUNE 1967

MOHAWK RIVER BASIN

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
NORTHEAST REGION
HUDSON CHAMPLAIN AND METROPOLITAN COASTAL PROJECT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SCALE IN MILES
NEW YORK
NEW JERSEY
WATERVLIET
TROY
ALBANY
RENSSELAER
HUDSON
KINGSTON
POUGHKEEPSIE
BEACON
NEWBURGH
MIDDLETOWN
FRANKLIN
IMMEDIATE NEEDS REPORT
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U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
NORTHEAST REGION
HUDSON CHAMPLAIN AND METROPOLITAN COASTAL PROJECT